160

The Royal London
Ophthalmic Hospital Reports,
and Journal of
Ophthalmic Medicine and Surgery.

VOL. VIII. PART 1. OCTOBER, 1874.

PART I.

Original Contributions.

SUGGESTIONS FOR FUTURE CLINICAL WORK IN OPHTHALMOLOGY.

By JONATHAN HUTCHINSON.

(Continued from vol. vii, page 438.)

A PAPER of much clinical value might be written on the symptomatic value of retinal hæmorrhage, and on the various conditions under which the retinal vessels suffer rupture. The following forms are, I suppose, recognised by most observers, and distinguished from each other;—

I. True *Retinitis hæmorrhagica,* characterised by innumerable small streaks of blood, all of them flame-shaped. It occurs for the most part to one eye only: it happens to seemingly healthy persons at middle or senile periods of life, and is very often associated with gout. It is rare.

II. Hæmorrhages in connection with evidences of *Albumenuric retinitis,* and with renal disease. Here the blood-spots are blotchy; very various in size; at or near the yellow spot and disc. They are probably due in part to pressure on the vessels by the deposit in the retina, and the disease may be distinguished at a glance by the presence of the latter.

III. Hæmorrhages in connection with *neuritis and swollen disc.* Here again the extravations result from pressure, but they usually occur as streaks, often as very delicate almost linear ones, and are placed on or in the new material which has accumulated about the disc.

IV. Hæmorrhages from *senile degeneration of vessels.* These are not unfrequently seen in senile or pre-senile periods of life. They are often of large size, and either single or few in number. They have their analogues in the ecchymosis often seen in the conjunctiva. It is chiefly in this group of cases that what is known as *hæmorrhagic glaucoma* occurs.

V. *Purpuric hæmorrhages.* These are only a local part of the general disease, known as purpura hæmorrhagica, and as it is rare they are very seldom seen.

VI. Hæmorrhages in connection with *Pyæmia.* These result from thrombosis and impediment to the circulation. It is not often that opportunities occur for examining eyes when attacked in pyæmia.

VII. There is a form of syphilitic retinitis often attended by hæmorrhages which occur repeatedly.

VIII. There are certain very rare cases in which large retinal hæmorrhages occur in young persons without evident cause, and which sometimes by recurrence, lead to blindness. There is some reason to suspect that this happens occasionally in connection with masturbation, or excessive nocturnal emissions. Very often the blood finds access to the vitreous, and it is perhaps difficult to feel sure that the primary rupture is not rather in the choroid than the retina.

IX. In the retinitis of diabetes hæmorrhages are sometimes met with. The changes are, I believe, usually symmetrical.

X. Lastly, we must mention the occurrence of extravasation into the retina as the direct result of blows on the eyeball.

I do not know that I have omitted any group which is as yet well recognised, but very probably more careful investiga-

tion would succeed in separating some of the cases which are usually counted under one or other of these heads, and showing that they deserve to constitute special groups to themselves. No doubt more correct and detailed observation would add much to our knowledge of the peculiarities of each group. Such questions as is the rate of absorption, the same in all examples of each group, and does it differ much in the different groups? can the form of the patches be relied on as evidence as to the special form, and is it tolerably constant in each? and what are the conditions usually left after absorption? should be kept in mind. The form and size of the patches are no doubt chiefly influenced by the size of the vessel ruptured, and its exact depth in the retinal layers.

Hæmorrhagic Iritis.

Hæmorrhagic iritis or hæmorrhage in connection with iritis is a far rarer event than its parallel in the retina. We observe blood in the anterior chamber, with proof of iritic changes as the cause, chiefly, I think, under the following circumstances :—

I. *After operations.* Bleeding is not unfrequent in cases of iritis after extraction of cataract. I do not recollect whether it was noticed in the days of the old method when the iris was not cut, nor do I know whether it happens to those who practice the Brussels or similar operations. In the common plan, which includes an iridectomy, it is possible that the wound of the iris has something to do with it, and in support of this view we notice that it happens now and then after iridectomy for glaucoma. Undoubtedly, however, it often occurs at considerable periods after the operation and when it might be supposed that the tissues were quite healed. This is by very far the commonest form of hæmorrhagic iritis. The next is, I think,

II. *Sympathetic iritis.* This is itself a rare disease, and it is only in a small proportion that the hæmorrhage is observed. When it occurs the blood is usually very dark, and

it hangs in threads instead of gravitating to the bottom of the anterior chamber. It is one of the very worst signs, and almost always implies total destruction of the eyeball. With it we usually find the iris-structure full of dilated vessels.

III. Certain rare forms of destructive iritis in elderly people are attended by hæmorrhages of the same kind as that which occurs in sympathetic iritis (dark strings). The blood is very slow to absorb. From the resemblance just noted, a suspicion arises that these cases may be due to a nervous cause of a similar kind to that which evokes sympathetic ophthalmitis. The cases are, however, very rare, and they require more study before any trustworthy opinions can be formed.

IV. There is a form of arthritic iritis which is attended by hæmorrhage. Successive attacks of iritis occur in the same individual, each attended by bleeding. In these the blood, or blood-stained lymph, is very rapidly absorbed, and, as a rule, the eye is but little damaged. The appearances at first are, however, most alarming. I have seen but very few examples of this form.

The power of absorbing blood effused into the anterior chamber varies very much in different cases. In some cases of chronic iritis after operations when the eye is unsound, it may remain for very long periods, weeks, or even months. The slowness of its absorption is always a very bad sign. My impression is that slowness of absorption is usually in ratio with darkness of tint, and that whenever it is of an unusually deep purple colour, the very worst may be prognosticated as regards the eyeball.

Amblyopia Potatorum.

Is there in English practice any form of amblyopia (neuritis, retinitis, or primary atrophy), met with in drinkers, and due to alcohol? We must exclude cases in which renal disease is first induced and in which the retinal mischief is secondary to the changes in the kidneys.

If, as there seems some reason to believe, the so-called amblyopia of drunkards is more common in France and Belgium than amongst ourselves, is it probable that something is due to the medication of spirituous liquors so common in those countries? Possibly absinthe and similar drinks may be injurious to sight, independently of the alcohol which they contain, and in virtue of other ingredients. It is very desirable to keep separate, as much as possible, the shares taken by alcohol and tobacco when both are used. If a man smokes heavily and drinks hard, is he more likely to suffer from the injurious effects of the tobacco or the alcohol than if he were to indulge in either alone? Cases in proof of the supposed ill influence of alcohol on sight must, if possible, be taken from those who have not been smokers. There are plenty of cases of tobacco amblyopia to be found in which the patients have never been drinkers.

If alcohol alone, and unmedicated, can cause amblyopia, what are the special symptoms which distinguish examples of its effects from those due to tobacco? Is there neuritis? Is there retinitis? To what stage does the disease usually advance?

If there are cases of amblyopia potatorum, are they usually complicated with other disorders of the nervous system, or is it defect of sight alone? It is a very remarkable feature of the cases of tobacco amaurosis that, as a rule, no other indications of nervous disorder are present. The patient will often declare that he feels perfectly well in all respects, and in fact ails nothing whatever if he could but see.

Mackenzie's Scrofulous Sclerotitis.

It is often a very useful practice to look up some of the less frequent maladies which have been carefully treated of by the best of our predecessors and note whether our own experience confirms their views. I do not recollect to have ever made, or known made by others, the diagnosis of "scrofu-

lous sclerotitis," yet Mackenzie, who was an admirable observer, has described a malady under this name, which he asserts to be well marked and of great importance. In the first instance, he had named it "choroiditis," and subsequently "sclerotico-choroiditis," but at length in the belief that the sclerotic is the part first and principally affected, he has preferred the name mentioned. He admits that the presence of scrofula cannot be proved in all cases. He states respecting it that it is rare in children, and more frequent in women than in men; that it sometimes follows other forms of disease, as corneal ulcer, syphilitic or arthritic iritis, &c.; that it is sometimes local and at others general, and that it usually ends in ciliary staphyloma. He adds that the iris is seldom inflamed, but that yet the pupil almost always undergoes a remarkable displacement which he attributes to some affection of the ciliary or iridal nerves. He states that it is difficult of arrest and prone to relapse, and mentions one case in which after much temporary improvement it ultimately, after many relapses in the course of twenty years, destroyed both eyes. It is not without interest to note further that Mackenzie's experience had led him to rely chiefly on blood-letting to arrest the disease. He took blood from the temple to the amount of twenty or thirty ounces, or applied twenty-four leeches around the orbit. Counter-irritation in some permanent and severe form he also thought well of, but he had been disappointed in mercury.

It is a good illustration of some of the tendencies of modern investigators that one of our most recent systematic writers, instead of describing the disease clinically as a whole, takes simply its most conspicuous pathological result, and writes a chapter on "Anterior Sclerotic Staphyloma." He goes back to Mackenzie's first creed, and states that this condition is in a great majority of cases due to irido-choroiditis.

Ought Mackenzie's term to be retained in our nosologies? Do we still recognise the disease which he describes? Have we ascertained anything further as its cause or as to the best measures of treatment? I suspect that what he meant is now

usually diagnosed as "Cyclitis," and possibly that term is really a more correct designation.

What are the Trophic Nerves of the Eyeball?

Can any observer supply facts which favour the belief that in the human subject the vaso-motor nerve exerts any influence over the nutrition of the eyeball? The following quotation is from the handbook of physiology in most general use:—"It is not at present possible to say whether the influence on nutrition is exercised through the sensitive or through the sympathetic nerves." * * * * "The truth perhaps is, that it may be exerted through either or both of these nerves. The defect of nutrition which ensues after lesion of the spinal cord alone, the sympathetic nerves being uninjured, and the general atrophy which sometimes occurs in consequence of diseases of the brain, seem to prove the influence of the cerebro-spinal system; while the observations of Majendie and Meyer, that inflammation of the eye is a constant result of ligature of the sympathetic nerve in the neck and many other observations of a similar kind exhibit very well the influence of the latter nerve in nutrition." Now I feel certain that ophthalmic surgeons have here the opportunity of helping physiologists. The experiments which the latter require are often furnished by disease ready to our eyes. So far as I have observed them, they point to a more definite conclusion than is indicated in the quotation given. That conclusion is that the vaso-motor nerve whilst it (1st), regulates blood supply, and thus slightly and temporarily alters temperature; (2nd), affects the action of the dilating fibres of iris; and (3rd), regulates in some way, not easily explained, the degree of prominence of the eyeball,—has no further share in modifying the nutrition of the eyeball. When the vaso-motor is paralysed the palpebral aperture is a little narrowed, and the globe looks sunken, and the pupil loses the power of dilatation, remaining motionless and of medium size. However long these conditions persist, no derangement of the nutrition of the eyeball, so far as I am aware, occurs. I have

seen several cases, and have watched some for long periods, and I never witnessed any ulceration of the cornea or congestion of the eyeball. I do not believe that the eye is in any danger, and thus far the statement of Majendie and Meyer, from experiments on animals, is not borne out by what is seen in human pathology.

If, however, the fifth nerve be involved in disease, or only its ophthalmic division, then the results are very different. The cornea, if deprived of sensation, is in great danger, and the risk is, I believe, in ratio with the completeness of the loss of sensation. It would appear that this paralysis of the fifth does not cause defects of nutrition, for the eye may remain anæsthetic yet in a state of perfect integrity for weeks or months. What occurs is an inability to control inflammation if inflammation is once set up. The slightest attack of corneal ulceration, however originated, is almost sure to run on to destruction. Thus, in some sense, it may be said to be a chance whether or not inflammation is set up; but once begun, there is then no uncertainty as to its progress.

It is just possible that after all the fifth nerve is "trophic" in no other sense than that the perception of pain is perhaps necessary in order to prevent the inflammatory process from running too high. It may be that the vessels are prevented, to some extent, from dilating by the reflex influence of pain, and that thus an anæsthetic condition leaves them without control. The phenomena which occur in herpetic inflammation of the eye would, however, seem to imply that the fifth has a more direct power in reference to the nutrition of the eyeball, and that, under some conditions, it can develop inflammation.

The questions, however, which I chiefly wish to ask are—Is there any reason to believe that in the human subject any other nerve than the fifth can, either by its irritation or its paralysis, influence the nutrition of the eyeball? and, secondly, are there any facts which imply that the vaso-motor can produce any other consequences than those which I have mentioned?

EMBOLISM OF CENTRAL ARTERY OF RETINA. MICROSCOPICAL EXAMINATION.

By Edward Nettleship, F.R.C.S.,
Late Curator of the Moorfields Museum.

Sudden Partial Loss of Sight in One Eye.—Embolism of Art. Centr. Retinæ diagnosed by Ophthalmoscope—Valvular Disease of Heart, and History of Rheumatic Arthritis.—Glaucoma three months after first symptoms; Iridectomy followed by temporary benefit; Recurrence of Glaucoma, and Total Loss of Sight four weeks after Iridectomy.—Excision of Eye four months after first symptoms.—Microscopical Examination.—Organised Clot in the two terminal divisions and trunk of Art. Centr. Retinæ.—Relation shown between Symptoms and Structure of various parts of the Clot.—Inflammatory Growths from inner surface of Optic Disc.—Œdema of and Hæmorrhages in Retina and Choroid.—Elongation of Rods and Cones.

The following is one of considerable interest. The comparative infrequency of cases which present the symptoms believed to indicate embolism of the central artery of the retina; the extreme rarity of opportunities for dissecting eyeballs in which these symptoms have occurred; the fortunate demonstration of a perfectly definite, organised fibrinous obstruction in the trunk and some branches of this artery, in an eye where embolism had been diagnosed by the ophthalmoscope; and lastly, the developmental changes undergone by fibrin deposited in *small* arteries, so far as these are illustrated by this specimen; all these reasons make a minute and even long account of the case desirable.

I have been able to find only three recorded cases in which the diagnosis of embolism of this artery has been confirmed by subsequent dissection of the eye.

Schweigger* figures the appearances found in the *art. centr. retinæ* a year and a half after embolism of the vessel had been diagnosed. The embolus is shown under a very low power, as a small, round, highly refracting mass, lying just at the level of the *lamina cribrosa ;* it completely fills the vessel. The artery is slightly contracted both above and below it, and is filled by a thrombus on the proximal side of the embolus. The retina was atrophied. Notwithstanding Stellwag's† adverse criticism of this drawing, it seems most likely that the appearance depicted was really produced by an embolism, a view to which its author‡ adheres in a more recent publication.

The second case, an important but rather doubtful one, is given by A. Sichel.§ It is accompanied by a drawing of no great merit. Here the left *art. centr.*, for a distance of 6 mm. ($\frac{1}{4}$ inch), in the substance of the nerve, was shrunken, and filled by unorganised material, partly consisting of yellow granules, and partly of an amorphous substance, which alone became stained by carmine. This ceased at 3 mm. behind the *lam. crib.* A plug also filled $2\frac{1}{2}$ mm. of the lower main arterial branch in the retina. The symptoms were complex, and their interpretation is doubtful, laying between embolism, thrombosis of an atheromatous vessel, and hæmorrhagic retinitis. The author inclines to embolism. The patient, aged 54, suddenly became blind of her left eye after a fright, which made her start. Next day a very large recent hæmorrhage was found at the y. s. region, and also many small peripheral ones of various dates, and in both eyes. The *disc and retinal vessels normal.* Vision extremely defective from a large central scotoma. Systolic bruit at heart's apex. No albuminuria. Sight improved in three months to 17 J. At four months it rapidly failed, and the disc was found partly atrophied; the arteries on and near it reduced to grayish-

* Vorlesungen ü. d. Gebrauch des Augenspiegels, 1864, p. 147.

† Stellwag, Diseases of the Eye (American Translation, 1868), p. 665.

‡ Schweigger. Handbuch d. Speciellen Augenheilkunde, 1871, p. 477, foot note.

§ Arch. de Physiol. Paris, t. iv, 1872.

white cords, but beyond the equator *increased* in size as they approached the ora serrata (this was confirmed at the post-mortem). The large central blood-patch now decolorised. Deep-seated pain had occurred behind the left eye. Later, the atrophy of the disc became complete, and the arterial shrinking extended to the peripheral branches. After fourteen months she died. There were small hæmorrhages and miliary aneurisms in the brain (no aneurisms found in the retina). The bicuspid valve was incompetent, but had no vegetations. No disease of intracranial part of left carotid or ophthalmic artery. The eye was removed sixty hours after death, in summer, and kept for five months in Müller's fluid before dissection. The symptoms differed much from those usually ascribed to embolism of *art. centr.*, and the author thinks this may point to *partial* obstruction as the cause of the ordinary cases, This conjecture seems to be borne out by the case which forms the subject of this paper, in which the accredited symptoms of embolism accompanied an imperfect block to the retinal blood-supply.

The third case is recorded by Mr. Priestley Smith.* The eye was examined with the ophthalmoscope seven days after the occurrence of sudden and complete loss of sight in it, and the diagnosis of embolism of the *art. centr. retinæ* given. Just *four months* after the loss of sight the man died, and the optic nerve was examined microscopically. In a *transverse* section of the nerve, immediately behind the eye, the canal of the central artery was found to be quite obliterated, its position being indicated "by a well-defined circular mass of concentrically arranged fibrous tissue adjacent to the vein." The *vena centralis* was patent, but much smaller than in health, and the optic nerve in its whole course was somewhat shrunken. In this case the loss of vision had been quite sudden, complete, and final; no other symptoms followed, except the ophthalmoscopic changes commonly ascribed to embolism of this artery, of which a very graphic description is given.

* British Medical Journal, April 4, 1874, p. 452.

The subject of the following account was at Moorfields under the care of Mr. Wordsworth, to whom I am indebted for permission to publish the case.

The patient, a clerk, aged 54, was standing at his desk at half-past three o'clock on the afternoon of December 24, 1872, when he suddenly "lost his sight." He thought both eyes were dim and said "they became puzzled." In a few minutes, however, after washing his face, he found that only the left was affected; it was not quite blind, but there was "a kind of bright mist" before it.

He remained in this condition for four days, when (on December 28th) he came to Moorfields, and was seen by Mr. Wordsworth, by whom "œdema of left retina and embolism of the arteria centralis retinæ" was diagnosed. Very distinct mitral and aortic systolic bruits were heard on auscultation.

There was no history of rheumatic fever, but the patient said that in the autumn of 1872 he had had an attack of acute and very painful inflammation of his right wrist, which his medical attendant called "rheumatic gout." He had outgrowths on the condyles of his right femur.

Small doses of iodide of potassium were ordered, and atropine used on the day of his admission. The iodide was continued with tolerable regularity for three months (till March 24th, 1873), but it is probable that the atropine was used only at his first visit to the hospital. At his visit on March 24th, increased tension and other symptoms of acute glaucoma was present. On the 27th these had increased; he could not then count fingers, and the visual field was so contracted that he described only "a diamond shape" of light as remaining at the temporal side. Iridectomy was accordingly done at this date. The operation was followed by temporary relief from pain, enlargement of the visual field, and improvement of sight, so that he became able to count fingers. On April 21 (between three and four weeks after the iridectomy), however, great congestion of the eye came on, and a day or two later he began to suffer severe pain

in the left temple and side of head, though not, he said, in the eyeball itself. Sight rapidly failed, and was soon quite lost. On the 26th there was no perception of light, the globe was intensely congested, the cornea so steamy that only a glimpse of the optic disc could be seen, and the pain still continued. Under these circumstances, Mr. Wordsworth excised the eyeball.

The eye was divided into halves at the equator, a minute or two after its removal from the orbit. The *vitreous* was perfectly transparent and apparently normal, with the exception of being perhaps slightly too fluid in the centre. It separated much more readily from the posterior half of the retina than is the case in healthy eyes, a change which is common in cases when there is inflammatory œdema of the retina and choroid. The *retina* was *in situ* everywhere, and showed slight but decided haze for some distance all around the disc; there was, however, no especial milkiness around the *yellow spot.* The following appearances were noted at the fundus in the still perfectly fresh specimen under a magnifying power of 30 diameters. All the chief retinal vessels, both arteries and veins, contained blood, and in both sets of vessels the column was frequently broken, leaving small empty spaces. This appearance, at least in the veins, was probably due to the *post-mortem* coagulation and shrinking of the blood. The principal veins in the retina were somewhat engorged, especially the one coming from the lower part of the eye; but at the margin of the disc, and on its surface, they became suddenly and considerably diminished in size. The column of blood in the arteries was very much smaller than that in the veins, while their coats were much whiter and appeared thicker than normal, a change due probably to simple contraction in consequence of the diminished column of blood. On the area of the disc, following the course of, and apparently enveloping the main upper and lower divisions of the artery, was a densely white structure, thickest near the centre where it disappeared in the "physiological pit," and tapering off above and below until it disappeared just within

the margin of the disc, at which point the column of arterial blood first became visible. It could be seen by the unaided eye as a minute white streak extending across the centre of the disc. It had about three times the diameter of the arterial branches which it obscured, and appeared to be an exudation around these vessels. The remaining part of the disc was slightly milky, but did not obscure the other vessels. Two arterial branches, of about the third magnitude, dipped into the disc at a little distance from its margin, and without joining the obscured trunks above described; one of these ran towards the *macula lutea*, the other towards the nasal side. In the retina, close to the temporal side of the disc, was a group of very small round hæmorrhages. Besides these blood-spots, there were three groups of glistening white deposits in the retina; one formed almost a single line of dots below and parallel to the nasal arterial branch mentioned before, another and larger group formed a narrow oblong patch in the same relative position to the above-mentioned temporal arterial branch, the third was a small group of very minute dots just below and to the nasal side of the yellow spot.

The posterior hemisphere of the vitreous was now removed and the corresponding half of the eye placed for four hours in a solution of chromic acid (·25 per cent.), and afterwards for three weeks in a filtered mixture of equal volumes of Müller's solution and methylated alcohol. As soon as the retina had become opaque a number of small, slightly raised dots came into view all over its surface, from which they were distinguished also by their somewhat whiter colour. They resembled, in naked-eye appearance, the elevations seen on the retina in early stages of general ophthalmitis from injuries and other causes, and were doubtless of the same nature.

Microscopical Examination.—Numerous thin longitudinal sections were made through the disc (including the neighbouring retina) and optic nerve, as nearly as possible parallel to the ascending and descending arterial branches and the white streak on the disc. They were stained in carmine. Four of these sections contained more or

less complete longitudinal sections of the *arteria centralis* and its main branches on the disc. The accompanying figures (Pl. I, figs. 1, 2, 3), were taken from two of these specimens. *Fig.* 1 is made up from two sections, those portions of the artery shown in thick black outline being added from another section: a careful study of all the sections having shown the arrangement depicted to be correct. *Fig.* 2 is a half-diagrammatic representation of the arteries alone, showing the relative position and extent of the fibrinous plug and the blood in them. *Fig.* 3 is a very correct copy of the embolus and neighbouring parts in the specimen from which the greater part of *Fig.* 1 was taken, but without the addition of the vessels *d* and *e*, the continuation of the trunk upwards beyond the branch *c* being only just indicated. These figures show that the *art. centr.* from a little below the *lam. crib.* to its division into the three main branches *c*, *d*, and *e*, is occupied by a pale substance, which passes also into *e* as far as this branch is included in the section, and extends for some distance into *d*, where it has a well-defined conical termination. Its lower extremity (*emb.* 1) is tapering and bifurcated. It quite fills the artery everywhere except on one side at the lower part (*h*, *Fig.* 3), where it gradually leaves the arterial wall. This separation begins just on the proximal side of the point from which the branch *a* is given off. The artery below the point, *emb.* 1, in the section figured, is empty; but in other and more nearly axial sections this part contains some ill-defined granular substance and near the proximal end of the specimen red blood reappears. When more highly magnified (112 to 400 diams.), this pale substance is resolved into a fibrinous and corpuscular structure having different characters in different parts. The most proximal part (*emb.* 1, *Fig.* 3), is composed entirely of rounded ill-defined corpuscles, about as large as white blood-cells, having finely molecular contents and large nuclei stained by carmine; these are separated by a small quantity of similar molecular substance, probably recently precipitated fibrin. 'A little higher up the corpuscles are more or less oval and often show two or more long pro-

cesses, and the intercorpuscular substance looks indefinitely fibrous, being either reticulated or arranged in parallel layers according to the plane in which it is viewed. From the most central part of the axial portion (*f*, *Figs.* 1 and 3) to the end in *d* and *e*, this structure is slightly rust-coloured, finely granular and contains many irregular rounded meshes. These meshes are formed by fibrous bands and threads with nucleated nodal points. One or two of these bands in the branch *d* look very like capillary loops, but as they contain no blood I cannot be certain that they are blood-vessels. The whole of this organised fibrinous plug from *f* forwards is closely adherent to the *tunica intima* of the artery; indeed, in the branches *d* and *e*, the arterial coat enclosing the plug is reduced to a single thin layer which is quite continuous with the bands and threads of the organised contents.

The blood in the arterial branch *d* beyond the plug is extremely dark; its corpuscles being shrunken, finely granular and ill-defined, while just at their point of contact with the embolus they are changed into large vesicular bodies. The artery *d* becomes suddenly much smaller just beyond the embolus, and its coats simultaneously much thicker, so that at the point *g*, quite within the margin of the disc, its internal diameter is only $\frac{1}{4}$ what it is just after its origin from the trunk. The blood in the three branches, *a*, *b*, and *c*, is, on the other hand, quite normal in all parts, even where in contact with the embolus at the mouths of these branches. The branch *a* appears contracted at its point of origin, but this is probably due to the section having passed to one side of its axis at that point. The embolus *seems* to pass for a short distance into *c*, but it is doubtful whether this is not a false appearance due to the mouth of this branch being seen through the main trunk. The only notable change in the coats of the *art. centr.* is a considerable annular puckering of its *tunica intima* at the upper part, and a corresponding change in the outer coats. The separation of the *intima* shown at the lower part of the figures probably occurred in making the section. Neither the *vena centralis* nor the two small

arteries mentioned at p. 5 were identified in any of the sections.

Remarks.—The appearances above described are evidently due to plugging of the upper part of the *art. centr.* and its two most distal divisions by fibrin, which has become more or less completely organised. It is clear also, from the altered state of the blood in the branch *d*, and the sudden and great contraction of its coats, no less than from the fact that organisation has advanced further in the clot in *d* and *e* than anywhere else, that the arterial obstruction occurred earliest in these two last-named vessels. Possibly the embolus was broken into two at the point where these terminal divisions of the artery arise nearly at right angles from the trunk. The obliteration of the vessel between *emb.* 2 and *emb.* 1 no doubt occurred gradually afterwards, by the deposition of fibrin and white corpuscles. There is nothing in the structure of the organised fibrinous contents of the artery by which to distinguish the *embolus* from the subsequently deposited fibrin (*thrombus*). The structure of the proximal part (*emb.* 1) shows clearly that it is more recent than the parts *f* and *emb.* 2; whilst from the unaltered state of the blood in *a*, *b* and *c*, it is probable that blood had passed into these branches from the main artery not many days before the eye was excised. The existence of the lateral channel, *h* (Fig. 2), and its partial closure by the most recent part of the thrombus, also support this view. This complete occlusion of the vessel whose mouth had longest remained pervious (probably *a*), may have caused the total loss of sight which came on about four days before excision, though it is difficult to see why this occlusion should have given rise to the recurrence of glaucomatous symptoms and pain from which the patient then also suffered. The relapse of glaucomatous inflammation would explain the pain and loss of sight equally well without the thrombosis. It is perhaps possible that the increased tension which formed part of the final glaucomatous attack may have predisposed to the final thrombosis by obstructing the flow of blood into the still pervious branch or

branches, and thus producing a partial stasis in the uppermost portion of the *art. centr.*

Changes in the Optic Disc, and other Structures.—One side of the disc is somewhat swollen. The opposite side shows, just within the choroidal ring, slight depression, which may possibly have been caused by the increased tension, but is just as likely to have been physiological. Several sections show portions of small tumours projecting from the disc. The largest of these begins near the centre and has a length in the sections where it appears, of half the radius of the disc; it is on the swollen side of the disc. Another, though not so extensive, is thicker and its surface slightly nodulated. None of these little growths happen to occur in the sections containing arteries; there can, however, be little doubt that they (or the largest of them) were visible to the unaided eye as a part of the little white streak already described on the disc, the embolus in the two terminal branches probably completing this appearance. These little growths are composed of embryonic tissue in various stages, their most superficial parts being formed altogether of roundish cells with large nuclei and the inner parts consisting of more or less developed fibres and fusiform cells. Some of the very smallest of these growths are entirely cellular, and in these the cells are arranged in groups which tend to become spherical; so that the smallest tumours form single nodules and the larger ones present a nodular surface. The *hyaloid membrane* (itself, in some parts on the disc, containing many large corpuscles) covers the free surface of these little tumours. Their relation to the *limitans interna* of the retina is not clear. In the largest of them there is visible a short portion of a small blood-vessel containing well-formed blood-corpuscles, and near to it are a number of highly coloured granules, probably the remains of a small hæmorrhage. In the swollen part of the disc there appear to be many nucleated corpuscles between the nerve-fibres. This appearance is no doubt due largely to varicose swellings of the nerve-fibres, but probably also to an exudation of inflammatory corpuscles. There are similar, but

less marked, changes in the nerve-fibre layer of the retina near the disc. One section of retina, near the disc, includes a small extravasation of blood, the corpuscles of which are much altered and very irregular in size and colour; it is evidently of considerable age. The other retinal structures show signs of prolonged general œdema. This is especially marked in the *rods and cones,* which have undergone in a high degree the lengthening and swelling which are common in eyes whose tissues are inflamed and œdematous.* There is also œdema of the choroid, and its epithelium is slightly pushed aside and heaped up at the edge of the swollen side of the optic disc. I did not succeed in tracing any anastomoses between the vessels of the choroid and those of the disc or retina, so that probably no extensive collateral circulation had been established.

* Ophthalmic Hospital Reports, vol. vi, p. 620. See also Index to same.

DESCRIPTION OF PLATE I.

FIG. 1.— × 38. (Partly diagrammatic). Longitudinal section through retina, &c., and optic nerve, including a section (nearly axial) of the *art. centr. retinæ* and its chief divisions. The branches indicated by thick black outline are added from another section.

a, *b*, *c* } Branches of *art. centr.* containing normal blood.

d, *e* } Terminal divisions of *art. centr.* given off nearly at right angles to it.

Emb. 1 and 2.—Organised fibrinous clot occupying upper part of *art. centr.* and commencement of branches *d* and *e*. Its conical end seen in *d*, but owing to engraver's error is not so plain in the figure as in the specimen.

f. Central part of thrombus. This letter, owing to engraver's error, is not clearly shown.

g. Extremely shrunken portion of artery *d*, containing shrivelled and degenerated blood-corpuscles.

The disc is seen to be somewhat swollen on one side, and slightly depressed on the other side.

FIG. 2.—Diagram of the arteries shown in Fig. 1, showing extent and shape of *embolus and thrombus*. The plugged vessels shaded light. Vessels containing blood coloured black. Lettering as in Fig. 1.

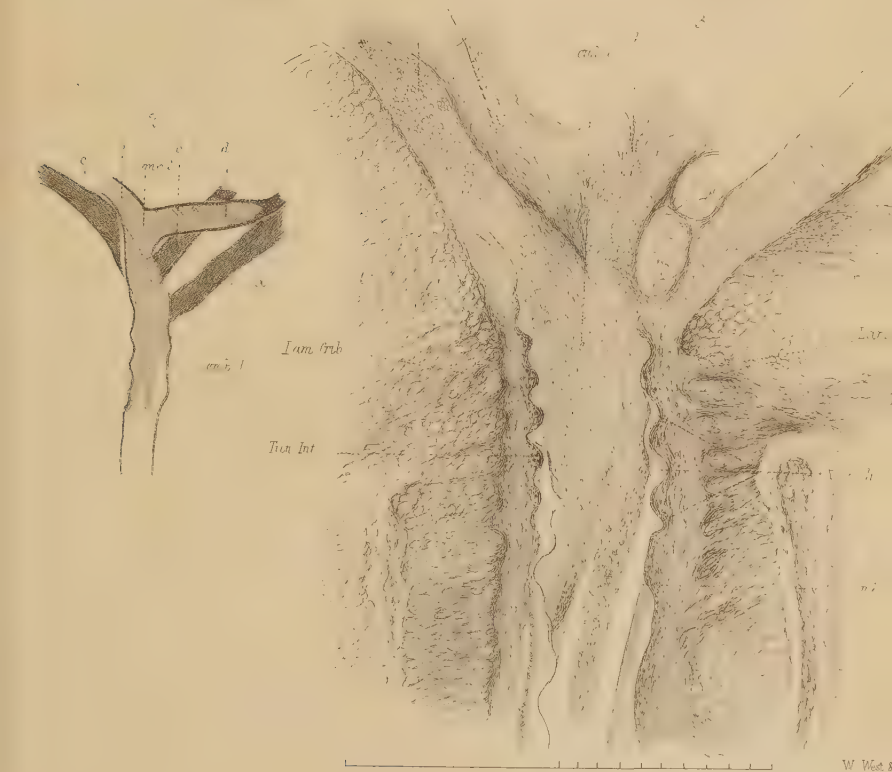
FIG. 3.— × 112. Upper part of *art. centr.* and some of its branches from same section as Fig. 1, but without addition of branches *d* and *e*. Lettering as in Fig. 1.

Emb. 1. Most recent part of thrombus, entirely corpuscular.

Emb. 2. Older and more organised part of thrombus.

h. Space between newest part of thrombus and wall of main artery. It extends nearly as far as mouth of branch *a*, and was probably the last to receive blood from *art. centr.*

Tun. Int. The wrinkled *Tunica intima* of *art. centr.*



Embolism of Arteria Centralis

SOME REMARKS ON THE TREATMENT OF CERTAIN KINDS OF CONICAL CORNEA BY OPTICAL MEANS, ILLUSTRATED BY A CASE.

By H. Bendelack Hewetson, M.R.C.S., Leeds.

The occurrence of regular astigmatism in cases of conical cornea which present themselves for treatment is so rare, that the thought hardly ever suggests itself of making any attempt to correct the optical confusion caused therefrom by cylindrical glasses.

Moreover, the success which has attended some of the various operations in such cases on the apex of the cone appears to have eclipsed all other modes of correction, and has seemed to give no other alternative to the patient but operation.

The following case shows, however, that it is well in all non-progressive cases of conical cornea to negative the existence of corrigible astigmatism before deciding upon an operation.

Doubtless, such instances are few and far between; or possibly they are overlooked, from an omission to test optically all cases of non-progressive conical cornea.

Notes of the Case.

Nov. 1872.—Mr. H. S., residing at Huddersfield, consulted Mr. Pridgin Teale in November, 1872, who entrusted the testing of his optical condition to myself.

His history is as follows:—

Several of his relations are myopic, and he himself has always been "weak-sighted," but in other respects healthy, never having had any severe illness or attack of inflammation in the eyes.

By profession he is an engineer, and consequently has constantly been employed in mechanical drawing, which frequently caused great pain in the eyes.

Two-and-a-half years ago he was obliged to discontinue his employment, and was advised to undergo an operation for the relief of his defective sight, which was found to be dependent upon conical cornea. However, he was dissuaded by his friends, since he managed to get about in moderate comfort with the aid of concave glasses.

His vision was not accurately tested at that time, from the idea that the conical cornea would progress, and render optical correction useless. His sight up to this time remained unchanged.

June, 1873.—With the unaided right eye vision was $\frac{20}{nil.}$, and he read Jäeger No. 1 at 2 inches with difficulty. In the vertical meridian, tested by the stenopæic slit, there was $\frac{1}{18}$ hypermetropia, and in the horizontal meridian myopia $\frac{1}{16}$; so that with the following combination of cylindrical $\frac{1}{18}$ ⌒ — cyl. $\frac{1}{16}$, Vision was raised to $\frac{20}{50}$, and reading to Jäeger 1 at 8″ distance.

In the left eye, the unaided vision is $\frac{20}{70}$, hypermetropia existing to the extent of $\frac{1}{40}$ in the vertical meridian, in the horizontal myopia, $\frac{1}{11}$.

The combination of $\frac{1}{40}$ cyl. ⌒ — $\frac{1}{11}$ cyl. raised vision to $\frac{20}{20}$, and the reading to Jäeger 1 at 12″ distance.

May 23rd, 1874.—These glasses have now been worn nearly a year, during which time, from becoming used to them, the acuteness of vision has much improved, and has in fact rendered his sight, as he says, "perfect."

I must add, that the astigmatism in this instance is mixed and regular in each eye, and the conicity of the cornea is very evident upon profile inspection; also, that the pupil of each eye corresponds accurately in area with the apex of the cone, so shutting off rays of light passing through the sides of the cone, which, were they permitted to enter from dilatation of the pupil, would probably have prevented all optical correction. So that it seems as if two principal curves existed in the cornea at the apex of the cone, limited to the area of the pupil, a curve of short radius corresponding with the myopic meridian and that of a longer with the hypermetropic meridian.

The difference in the improvement of vision between the two eyes seems to depend upon some amount of amblyopia existing in the right, for on an examination with the erect image, with the glasses adjusted before the eyes, the fundus appears regular.

ON A VISIBLE STELLATION OF THE NORMAL AND OF THE CATARACTOUS CRYSTALLINE LENS OF THE HUMAN EYE.

By John Tweedy, M.R.C.S.,

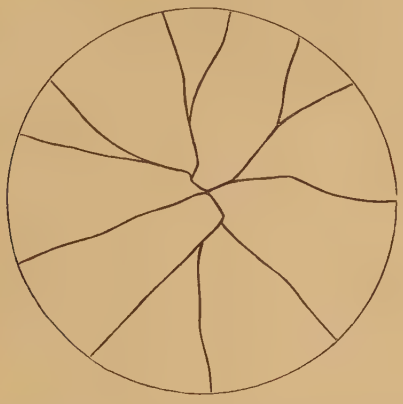
Assistant Medical Officer in the Skin Department of University College Hospital, London; and Clinical Assistant at the Royal London Ophthalmic Hospital.

The striation, or, more correctly speaking, the stellation of the normal crystalline lens of the human eye is well known as a *post-mortem* appearance, but few persons are aware that it can readily be seen by oblique illumination in the living eye. Nearly three years ago I described elsewhere* this stellation as observed in the healthy human eye, and endeavoured to explain the method by which it may be brought into view. The latter was by no means an easy task, for I could only give general directions as to plan to be adopted, and could not definitely state how the rays of the stella could be surely and certainly seen. The mode of procedure, however, is that employed in ordinary oblique illumination of the anterior parts of the eyeball by the aid of artificial light. The observer must endeavour to obtain the greyish glistening reflection from the anterior capsule, and must look more obliquely along the anterior surface of the crystalline lens from the side opposite to that on which the light falls than in the ordinary oblique illumination. If by this means a view be obtained of the anterior stella of the lens it will be found to consist of fine, dark, radiating, and slightly undulating lines, about ten in number, extending from near the centre of the anterior surface of the crystalline lens to its extreme periphery. It will be seen in Fig. 1, which has been taken from a normal eye, that, although the rays are united towards the centre of the anterior surface, they do not all start from

* Lancet, 1871, vol. ii, p. 776.

exactly the same point, as is usually represented in drawings taken from the lens after death.

Fig. 1.



The precise manner in which the rays unite at the centre varies very much, but in every case a conformity to a particular plan may be observed. I have never yet seen the arrangement figured in Stricker's Histology.* In the accompanying woodcut (Fig. 2), for which I am indebted to the Council of the New Sydenham Society, it will be seen that all the rays of the stella, except one, are represented as converging to the same point in the centre of the anterior surface of the lens.

Without wishing to impugn the accuracy of the representation in this particular instance, I must say that such an arrangement is exceedingly rare, and has never been seen by me in the large number of examinations which I have made.

But in addition to main rays which converge towards the anterior pole there are secondary rays which branch from the primary ones, and which have their vertices at varying distances from the pole. Sometimes there are tertiary branches, and in the diseased eye I have seen even quaternary rays.

* Stricker's Histology, vol. iii, p. 364. New Sydenham Society's translation.

Fig. 2.

Before proceeding further in the consideration of the relation which the rays of the stella bear to the nutrition of the lens and of their influence on vision, I must in justice to others and to myself refer to a question which has been raised as to my claim to have been the first to describe these rays as objectively seen in the living eye. At the time that I published my first article on this subject I had reason to believe, from the assurances of some of the most eminent anatomists and ophthalmic surgeons in London, whose names I need not here mention, that a visible striation of the living normal crystalline lens had never before been described. But within two days of the appearance of my article I found, in reading the chapter on Entoptics in Professor Donders' work, what I believed to be a confutation of my priority; for, after describing certain entoptic appearances of his own crystalline lens, Donders says, "These phenomena are connected with the composition of the lens of the so-called sectors, which, as Helmholtz showed, can be very well seen with the mag-

nifying glass, with lateral focal illumination in the living eye."*

Now, although I knew that the sectors could be seen without the fine rays themselves being distinguished, I felt that the excellent observer referred to could scarcely have failed to see the rays when examining with a high magnifying power the lens sectors; but being unable to find any satisfactory statement in Professor Helmholtz's work on Physiological Optics, I, at the recommendation of Professor Sharpey, wrote to Professor Helmholtz to ask him where he had described the visible normal striation of the living lens, as I was desirous of publicly disavowing my claim. In the kind and speedy reply to my query I was assured that, although the lines which I had figured were evidently identical with those described by Listing,† and mentioned by Helmholtz himself‡ as entoptic images, yet not only had he never seen them objectively in the living eye, but that, as far as he knew, they had not been seen in such a manner by any other observer. But Professor Donders, whose acquaintance I subsequently had the honour to make, and to whom I am indebted for several of the subjoined references, has informed me that he was well acquainted with the stellation which I had figured, and that he had been led into the error of ascribing the first description of them to Helmholtz by the fact that the latter had stated that by oblique illumination he was able, in some instances, to make out the sectors of the lens, and that it was in looking for these that Dr. Donders had observed the rays of the stella, and naturally concluded that Helmholtz had also seen them.

But apart from these trivial concerns, the lines have I think an importance which has hitherto been imperfectly understood. This, therefore, must be my excuse for bringing before the members of the profession, and especially before

* Refraction and Accommodation of the Eye. New Sydenham Society's translation, p. 201.

† Beitrag zur Physiologischen Optik, Göttingen, 1845.

‡ Physiologische Optik, p. 152.

Ophthalmic surgeons, some of the results of my examinations and the conclusions which I have drawn therefrom.

In the normal eye the rays of the stella vary in number from eight to twelve, including the primary and secondary rays. In a child two and a half years of age I was able to count nine rays, but I have not, for obvious reasons, succeeded in seeing any rays in younger children, so that I cannot say when the three primary rays found in the fœtus begin to divide, or at what rate the division and ramification of the rays take place.

In children of about five or six years of age I have, however, frequently seen the commencement of the branching of a primary ray, and I am inclined to believe that the ramification is always centrifugal, that is, commences from near the pole, or in the case of a secondary ray, that it commences from a primary ray and extends towards the periphery, and never from the periphery towards the centre. In the diseased eye, however, especially where the lens is beginning to undergo cataractous changes, the number of the rays may become greatly increased. For instance, in a patient whose lens showed signs of the commencement of posterior cataract from disease in the posterior segments of the globe, there were twenty of these rays.

The rays also may be shown objectively and subjectively to be of a different refractive power from the interlinear sectors. But at present I wish to speak only of the objective appearance, and shall refer more in detail to the subjective phenomena in a subsequent part of this article. In an ordinary eye the rays appear black or brown in colour, the particular shade varying with the general pigmentation of the eyeball, but in the albino they are red. In the first albino that I examined they appeared as clear red lines on a duller red ground, and in an albino that I recently saw they showed themselves as clear red lines without the glistening satiny haziness which the interlinear portions of the lens presented.

Perhaps the most interesting result of the regular and

methodical examination of the rays is the knowledge afforded of the inception of cortical striated opacities at the anterior part of the lens. But before we can profitably engage in the consideration of this question, we must stop to consider briefly the anatomical structure of the healthy lens. The earlier histologists, Henle, Kölliker, but especially Becker,* asserted that the ends of the fibres of the lens do not come in immediate contact at the rays of the stella, but that there is an intervening space, filled with structureless or granular matter, to which and to the supposed interfibrillary passages, Becker attributed great importance in the changes undergone by the lens in accommodation. But this has been shown by Zernoff,† Babuchin,‡ and others, to be erroneous. The microscopical examinations of these gentlemen have proved that the rays of the stella are merely the seams formed by the apposition of the ends of the fibres, and that under high powers these rays appear as fine sinuous lines, without the interposition of any material whatever. With the statement made by the latter authorities, the result of my examinations of the living lens *in situ* entirely accord.

The error of regarding the stellate fissures as spaces filled with granular matter doubtless arose from the fact that "the superficial fibres are usually very soft and delicate, and easily break up in macerating fluids into detached drops of various sizes (hyaline drops), but partly also into a finely granular or structureles mass. This breaking-up occurs also spontaneously after death, and inasmuch as it chiefly affects in the first instance the extremities of the fibres, it is intelligible that the products of the breaking up must principally accumulate in the stellæ of the lens."§ From this it will be evident that the opinion of those who regard the rays of the stella as actual structures, and capable of undergoing cataractous changes, cannot now be accepted, the rays themselves

* Arch. für Ophthal., t. ix, A 2.
† Arch. für Ophthal., t. xiii, A 2, p. 521.
‡ Stricker's Histology, vol. iii, p. 365.
§ Stricker, vol. iii, p. 369.

being, as it were, negative structures, mere fissures or seams, formed by the apposition of the ends of the fibres. Nevertheless, every ophthalmic surgeon is acquainted with radiating striated opacities, which bear a close relation to the rays of the normal stella. How are these to be accounted for? Whatever may be the imperfections in our knowledge of the actual processes which determine the molecular changes that give rise to cataractous opacity, we know that they are, directly or indirectly, the result of altered, perverted, or impaired nutrition; and as the lens is entirely extravascular, it must depend on the structures and fluids immediately surrounding it for its nutrition-supply. The interchange of material between the lens and the surrounding tissues, therefore, takes place by processes of endosmosis and exosmosis, and if either of these processes be interfered with by the imposition of mechanical and physical obstacles, or by an alteration in the surrounding tissues or fluids, we can easily understand that the parts most likely to be primarily affected are those which adjoin the rays of the stella—the fissures formed, as it were, by the discontinuity of the lens fibres, where the endosmotic process are most active. These are in fact the parts of greatest vulnerability, and are most liable to become affected by disturbed nutritive changes. As a proof of this we may note that in the earliest stages of senile cortical opacities, or of opacities accompanying inflammation of the vascular tunics of the eyeball, that these are always the parts primarily affected. Of this I have become convinced by numerous examinations.

The earliest perceptible cataractous changes in the cortical layers of the lens, especially of old people, show themselves in the ends of the fibres adjoining the rays, and the clear dark line of fissure may frequently be seen to border the opaque ends of the fibres, or even to pass between the opaque ends of the two opposing sets of fibres. Even in the cortical opacities of young children, a ray of the stella may often be observed bordering a cataractous stria, or passing down its middle if the fibres on both sides be involved. Often in iritis,

where the aqueous humour becomes turbid, a haziness may be observed in the end of the lens fibres, adjoining the rays of the anterior stella, and in choroiditis, and acute affections of the vitreous, a similar condition may be observed in the posterior stella. This haziness often, however, entirely disappears when the inflammatory condition has subsided. The temporary haziness is evidently due to altered nutrition conditions existing during the inflammatory state of the surrounding parts. But sometimes the haziness thus induced continues steadily to advance to thick opacity. Quite recently an interesting case of posterior polar and stellar cataract came under my observation, through the kindness of Mr. John Couper. The patient was a man aged 32, who had suffered from nystagmus and impaired vision for about 16 years. On examining the crystalline lenses, a well defined posterior stellar cataract could be seen in each eye. In the right eye, including secondary and tertiary branches, there were fourteen rays, and in the left eye there were twelve. The rays were of a dark grey tint, and extended from an opaque mass at the posterior pole outwards to the periphery, where they abruptly terminated, none of them passing round the margin of the lens on to the anterior surface. Running down one or two of the opacities, a fine dark line could be seen, but whether these dark lines were the remains of the original fissures, I cannot say. Although the interlinear sections appeared slightly hazy by oblique illumination, the fundus oculi could easily be seen by direct examination with the ophthalmoscope. In both retinæ and choroids there were large irregular proliferations of pigment. It is, therefore, in the highest degree probable that the cataractous changes were primarily induced by the altered nutrition relations existing between the vitreous and the posterior segment of the globe and the lens, and that the effects of these showed themselves in the parts of greatest vulnerability, namely, the rays of the posterior stella.

But it is only up to a certain stage that the original rays of the stella may be distinguished in cataractous striæ, for, sooner or later, the retrogressive changes extend, so that the

line of the ray ultimately becomes obliterated by the disruption of the lens tubule, and destruction of its contour.

From what I have alleged, it will be seen that I dissent from Professor Stellwag who, in speaking of the senile changes of the lens, says: "Most frequently we meet radiated striæ which usually follow the course of the lens-filaments, and depend on cloudiness of the lens-filaments themselves, and on depositions of molecular masses in the interspaces."* If what I have asserted be correct, it follows that the "radiated striæ" are formed by the opacity of the ends of the lens fibres, and that they do *not* follow the course of the lens-filaments which would really give them a bi-penniform arrangement with the ray of the stella as a stem, unless the opacity were confined to the few fibres which converge to the pole. I must also protest against the strict accuracy of the following statement made by Professor Stellwag in the last edition of his excellent and learned work:—"In rare cases . . . some or all of the rays of the star-shaped figure become bluish-white and hence become distinct from the still transparent surrounding parts."† But here I cannot but think that the illustrious Vienna professor refers to the same appearances which I have described, but has not recognised the real relation which the rays of the stella bear to the opacity.

With all humility I must also demur to the opinion of that accomplished physiologist and ophthalmic surgeon, Mr. Bowman, who, in speaking of the cataractous striations of the lens in middle or declining age, says:—"Now I can entertain no doubt that the streaks in these cases are sets or bundles of the superficial layer of lenticular fibres reduced to a state of opacity by some nutritional change. There seems to be a disposition in the fibres of the lens to become opaque in their entire length when once they are altered at a single point, and hence the linear figure of the opacity. The opacity probably commences in the middle part of the fibres near the margin of the lens; and the arrangement of the fibres would

* Diseases of the Eye; 4th edition, p. 591. American translation.

† *Loc. cit.*, p. 604.

account for the different length of the streaks, some approaching nearer than others to the central point of the surface."* Now although I grant that when a fibre is once affected at one point, the change is liable to extend itself through the entire length of the fibre, yet I believe that in most cases the opacity occurs primarily in the ends of the fibres adjoining the rays, and that the different lengths of the cataractous striæ are to be accounted for by the different length of the primary, secondary, and tertiary rays. But it is only just to add that Mr. Bowman seems to have been the first to recognise the multiplicity of the rays of the stella, and has indeed given a very accurate representation of them,† with the exception that he has not followed the divisions of the rays to the periphery of the lens. Mr. Bowman did not, moreover, overlook the significance of the rays in formation of cataract, for he says, "In another variety of opacity in adults, there are streaks visible either on the anterior or posterior surface, before the nucleus manifests any tendency towards dulness, but instead of converging from the border of the lens, they rather diverge from the central point. These streaks are also irregular in number and direction, and it has never occurred to me to distinguish in them any exact representation of the edges of the mesial planes as they are seen on the surface of the prepared lens; never, certainly, any trilinear figure. But a glance at the representation above given of the complex arrangement of the mesial planes of the adult human lens, will suffice to explain why they are rarely seen in such opacities. In the healthy lens they are in reality too near together, and too irregular to be detected without a glass. The triple divergence can even then only be recognised for a short distance, beyond which the planes seem to diverge and branch without any attempt at geometrical precision. We cannot, therefore, wonder that an opacity, spreading from the centre of the lens, and which consists of broad, ill-shapen streaks, should fail to disclose the radiation of the mesial planes, although it

* The parts concerned in the operations of the eye; 1849, p. 72.

† *Loc. cit.*, p. 68.

seems highly probable that its seat is, primarily and essentially, rather in the edges of those planes than in the fibres themselves."* From this extract it will be seen how near, twenty-five years ago, Mr. Bowman approached what I now maintain to be the fact. My own experience corroborates that of Mr. Bowman with respect to non-occurrence of trilinear opacity in the adult lens. I must, however, observe that in one or two instances in old persons, where the nucleus of the lens had become opaque and amber-coloured, I have noticed a gaping of the rays apparently from shrinking of the cortical layers, and that this gaping assumed the trilinear form, the rays of which had the same direction as those of the fœtal lens.†

The most remarkable case I have ever met with is one, an enlarged representation of which is given in the Figure 3. Such a condition as is there shown is, I believe, unique. By

Fig. 3.

* *Loc. cit.*, pp. 72 and 73.

† Since the above was written, my attention has been called by Mr. Buller to a well-marked trilinear opacity in the adult lens. But in this case the streaks had the appearance of an inverted Y, and could not therefore have been due to an opacity extending along the edges of the planes of the trilinear figure of the fœtal lens, unless we imagine the lens to have been inverted.

an examination of this figure, it will be seen that the most superficial fibres of the anterior portion of the lens are opaque, while the rays of the normal stella and the periphery of the lens are quite transparent. The clear lines which are evidently identical with the normal rays, consist of primary, secondary, and even tertiary rays. It will be seen that the secondary ray from the horizontal line to the right of the figure is not yet complete, and only extends a short distance along the anterior surface of the lens. By transmitted light, all the parts shaded black in the engraving allowed the red reflex of the fundus to be seen through them. The opacity was, as I have said, very superficial, for when the pupil was fully dilated with atropine, as represented in the figure, the lens behind the opacity could be seen to be quite transparent. With this eye the patient could read No. 2 Snellen and $V = \frac{20}{200}$. The only history I could obtain from the patient, who was a woman aged 42, was that the sight of this eye had become dim after a blow which she received twenty-two years ago. I can offer no explanation as to nature of the cataract, or as to its exact seat, but wish only to relate the facts. The opacity was not capsular or sub-capsular, for then the stellation would have been invisible. I have frequently met with instances in which one or two sectors were affected, and Ruete* has also figured such cases; but, as far as I know, no case at all resembling the one now figured has been recorded.

I shall now refer to a phase of this subject which is better known, namely, the subjective examination of the rays, their functions, and their influence on vision. If we throw homocentric light into the eye, we may observe an entoptic figure of the radiating lines of the crystalline lens, as was first pointed out by Listing.† This observer also described an umbilicated radiating body, which he regarded as being due to the separation in the fœtal state of this part of the capsule from the inner surface of the cornea;

* Bildliche Darstellung Krankheiten des Menschlichen Auges, Leipsig, 1854.

† *Loc. cit.*, p. 17.

but concerning this, Donders says, "In examining the entoptic phenomena I found that multiple images, lines radiating from points of light, and the entoptic image of Listing, pass imperceptibly into one another, and therefore have one and the same origin; but respecting the proper cause in the structure of the lens, I could form no satisfactory idea, and even now I have not been sufficiently successful in my attempts to make known the result."* Whether this umbilicated body is a constant element, or whether, indeed, it be not the result of an erroneous observation, I do not pretend to know; but it must not be forgotten that many of Listing's observations were made on persons who were not acquainted with the subject of ophthalmology or of physiological optics, and that, therefore, they may not have correctly interpreted their subjective sensations. Nor can I offer any other explanation of the case which is mentioned by Listing, in which there were no radiating lines seen entoptically. From what we know of the anatomy of the lens, it seems highly probable that their alleged absence was the result of the negative fallacy of non-observation. Professor Donders has, however, informed me that some time ago he also had a case in which no radiating entoptic lines were seen. And two years ago, Mauthner recorded a case in which a star was seen as a point of light, and in which the vision at this distance was acute, that is, no rays were observed. Beyond the explanation I have given of such cases I can form no opinion, for it is difficult to conceive a condition of the crystalline lens which will allow of normal acuteness of vision, but in which the rays of the stella, at least, the primary rays do not exist; because the trilinear rays seem to be essentially associated with the formation of the lens, while the multilinear ones are as closely connected with its development and growth.

Many of the phenomena of irregular astigmatism have their origin in the rays of the stella. Monophthalmic polyopia, for instance, has been shown to be the same condition as that which gives rise to the rays of a bright star or

* *Loc. cit.*, p. 550.

point of light at a distance for which the eye is not accommodated. We know, also, that by passing a small point of light into the eye, we may observe the rays proceeding from a point of light to pass into the well known radiating entoptic image. The monophthalmic polyopia, rays of stars, and radiating lines of light in the entoptic images are, therefore, all dependent on the same peculiarity in the structure of the lens, namely, the existence of the stella. Donders has, moreover, pointed out the fact that the sectors of the lens which are divided off by the rays of the stella form distinct images of a point of light, for by moving a small aperture before the pupil, he has observed that when the aperture is opposite a sector, a single image is formed; but when it is moved to the boundary between two sectors, two faint images appear, of which, on further displacement, the one first seen disappears. On rapidly moving the small aperture before the pupil, the little images of light jump as it were from one sector to another.*

We may also determine subjectively the influence of the rays of the stella in vision by regarding a large number of fine concentric and equidistant circles, such, for instance, as those figured in Helmholtz plates.† In that figure the inner circle is about the fiftieth of an inch in diameter, and the outer one about 2 inches in diameter, the intervals between the peripheries of the intervening circles being about the fiftieth of an inch. If the eye be made myopic by placing before it a convex glass of, say, 6 inches focal length, and the figure placed at about 5 inches in front of the eye, all the fine circles will be seen clearly defined, that is, if the eye of the observer be otherwise emmetropic. At about $5\frac{2}{10}$ inches the small inner circle becomes obscured on one side, and at about the fifth of an inch further, a second small circle appears at the obscured side. Further still, the circle becomes crenated by the multiplication of images, passing through many sectors. At about 6 inches the circles will no longer be clearly seen throughout their whole circumference, but become divided into sectors, which at $6\frac{1}{10}$ inches are dis-

* *Loc. cit.*, p. 546.

† Fig. 4, plate ii.

tinctly separated. At this distance a large number, from 10 to 15 sectors, consisting of irregularly shaped cones of well-defined portions of the circumferences of the circles may be observed, with intervals of a greyish neutral tint, in which the lines of the circles cannot be made out, so that gaps appear at intervals across the peripheries of the circles. Towards the periphery of the figure secondary and tertiary divisions may be detected in the radiating cones of clear lines, corresponding, I believe, to the divisions of the stellar rays. With my eyes, which are astigmatic to about $\frac{1}{100}$, I can at the greatest distance of distinct vision see clearly the rays in and adjoining the vertical and horizontal meridians, while those in the oblique meridians are less distinct, but may nevertheless be made out. Towards the centre of the figure the obscured intervals are not so well marked, and the circles are broken up into crenated and polygonal figures. It must be noted that if the observer's eye be astigmatic, the anomaly must be corrected, in order to make out the phenomena, which I have here attempted to describe, as seen by myself.

It will be seen that my remarks have applied exclusively to the examination of the living crystalline lens. The opportunities of making a microscopical examination of the commencing cortical opacities are so rare, that it has never fallen to my lot to meet with a cataractous lens after death which was not already advanced far beyond the stage to which my remarks on the formation of cortical opacities apply. I have also confined myself to the consideration of cortical striæ, and do not pretend to offer any explanation of the causes which determine some of the other varieties of cataract, such as the dotted, the zonular, or the nuclear, all of which are probably due to entirely different conditions from those which give rise to the radiated cortical striæ, and many of which are caused by formative changes of various kind, and by the proliferation of the nuclei of the lens fibres.

ECTOPIA TARSI: A CASE OF CONGENITAL MISPLACEMENT OF THE EYELIDS OF ONE EYE.

By J. F. Streatfeild.

The case of deformity I am about to describe is perhaps the only one of the kind recorded; at any rate, for its rarity, it is a case worth recording in a special journal in which practical matters are of primary but not of exclusive importance. My drawing, made at the time when I used to see the patient, is here reproduced, and I may add that in all the principal dimensions, and especially of the misplaced eyelids, as to their relations to the nose and as to their depression below the level of the normal eyelids of the other eye, my portrait was corrected by accurate measurements, made upon the face of the patient, and transferred to the paper. Besides the drawing, the description of the case is rather uninteresting, and the history negative; but even so, they answer some questions that very likely might be asked by anyone who saw the case for the first time, or who now regards the representation of it.

Martha Sanders, aged 21, single, a needlewoman, came to me at the Moorfields Hospital on the 16th of June, 1872, for the first time. She was a worker in black crape, and had been obliged to give it up; her eyesight was too bad, she said, the work made her eyes painful. The right eye, she thought was the more painful. She "cannot see for long together." She was hypermetropic, and read for half an hour comfortably with weak convex glasses, whereas she could only read for ten minutes without their aid. She was thin and pale, and said she had been living low, having been out of work lately, and had fallen away. But she seemed to be in good general health. A quinine and iron mixture was ordered, and was continued for some time with benefit. Finally she had a pair of glasses—convex No. 18. Her right eye was amblyopic; with it she could only read $\frac{1}{200}$ and $3\frac{1}{2}$ of Snellen's test types. With the left eye she read $\frac{2}{30}$ and

$1\frac{1}{2}$ of the same types. The right eye, I may say, *in limine*, seemed, neither in external appearance, nor by ophthalmoscopic examination, to be any way different to the left; there was no perceptible distinguishing trace of disease, past or present, in it of any kind.

But the remarkable characteristic of the case was in the sloped direction of the right palpebral aperture, the lids being, in appearance, drawn down wholly and evenly at the inner or nasal side of the right eye. But there was neither any puckering of the skin, nor thickening of any subcutaneous part, nor any appearance of cicatrisation in the neighbourhood of the right eye, or the right side of the nose. The skin was everywhere as soft and pliable as is natural. The patient thought nothing of the deformity; "it was always so." She came only for the failing eyesight.

The position and movements of the right eyeball seemed to be quite natural and symmetrical with the other, and not to be in any way involved in the misplacement of the eyelids. The movements of the eyelids, as regards the opening and shutting of the right eye, were complete and perfect. The eyelids themselves of the right eye, speaking generally, were like those of the other eye, no way defective. But when the eyelids of the right eye were drawn forcibly outwards (in this case also somewhat upwards) over the eyeball, in the way to demonstrate the tendo palpebrarum, by making it tense and prominent through the thin skin beneath which it lies, it was found to be divided or double, two cords, one to each tarsal cartilage, going inwards and *downwards*, quite separate throughout, not converging, to be attached to the bone; parallel in their direction to separate points of attachment, with an interval of about two lines. The *tendines* were then to be felt, as well as seen, distinctly through the skin as two rounded cords; the interval between them was felt as a considerable depression, and it showed a deep shadow when viewed in a strong side light. One other small peculiarity was discovered by a particular examination of the right eyelids; in the place of the right upper punctum was a slit-

Streatfeild del

W. West & C° imp.

Ectopia Tarsi.

shaped aperture along the canaliculus (just as if it had been slit by operation, and kept patent afterwards) to the extent of two lines from the punctum itself. The patient was sure that the operation in question had never been done, and it is hard to conceive why it ever should have been required, as the much more important *lower* punctum was in its normal condition. Both puncta of the left eye were of the usual shape, and in the natural position. When I inquired of the patient as to any former lacrymation of the right eye, she said that when her eyes watered, the right was the more watery of the two, but that was all, and I suppose that it would be so, of course, because, by gravity, any small quantity of tears in the right eye, instead of resting on the lower lid, must have run at once into the *lacus lacrymalis*, which was drained by the *downward* direction of the acute angle of the inner canthus in this particular case.

In regard to the bones of the face, I could not detect anything abnormal, or any difference in the conformation of the two orbital apertures, in which both eyes alike seemed to be rightly and symmetrically placed, unless it were that the right upper maxillary bone was ill-developed, dwarfed, or defective; this, I am inclined to think, was in some degree the case, at least as regards the nasal process of that bone. The roof of the mouth was very high, but not apparently higher on the right than on the left side. The posterior pillar of the soft palate seemed to be somewhat longer and further back on the right than on the left side. The alveolar processes of the upper maxillary bones seemed to be equal and regular on the two sides. The upper and lower grinder teeth of the right side were very thickly coated with tartar, which was not the case on the left side of the mouth. The nasal process of the right upper maxillary bone seemed to me to be congenitally dwarfed, because of the height of the bridge of the nose on that side, which was decidedly much greater than the height on the left side of the face. (Had it been accidentally depressed at the time of her birth? See below.) The tendo palpebrarum is attached to the upper maxillary

bone, and that the inner angle of the right palpebral aperture was so much drawn down was the pathognomonic sign of this singular case. The right ala nasi, as seen in the drawing, was also much drawn upwards in this patient, and was also thinner than on the left side. The septum of the nose was much displaced to the right side. When the mouth was shut, and the right nostril closed with the finger, she could breathe, but not when, under the same circumstances, the left nostril was so closed; some little air did pass by the right nostril. The nasal bone of the right side did not seem to be out of place.

The exact position of the inner canthus of the right eye was on the edge of the orbit, at its inner and lower part, three-eighths of an inch below the level of the left inner canthus. Sensation, on either side of the face, in all parts, was equally good. The patient said she was the eldest of the family; after her there were three or four still-born children, then came her brother, and three younger children. Of her brother, aged 10, she told me he had precisely the same distortion that she had, but of the left eye, that his eyelids were not so much drawn down as hers, and that his nose was nor like hers, awry. He could not come, she said, that he was ill in bed, dying of consumption. Except her brother, she said, none of her relations had any peculiarity about the eyes. She herself had no other peculiarity. Her irides, like her father's, she said, were hazel; her mother's eyes were blue.

I was naturally anxious to see her brother, and as he could not come to me, I asked where I could see him, and got her mother's address, in Hackney, and made an appointment. When I got there, the mother denied having any but the very young and healthy-looking children I saw in her (sitting) room, besides her eldest, Martha, who was gone out just then. She denied having a boy of 10 years old, ill of consumption. When the eldest daughter was born, her mother said she had a bad time of it, and that it was a foot presentation. She said also that the deformity about the eye,

in her daughter's case, was nothing now to what it had been when she was little; all the right side of her face, her eye, nose, and mouth, were then "all drawn up together." "We thought she never could live." "She had no snuffles, or any skin eruption." If she had a son ill in bed, I was not allowed to see him, and I never again saw her daughter.

MISCELLANEOUS CASES AND OBSERVATIONS.

By Jonathan Hutchinson, F.R.C.S.

(Continued from vol. vii, p. 47.)

The following cases will, it is hoped, sufficiently explain themselves, and do not require much comment. The first seven illustrate some of the conditions in which, independently of renal disease, sudden hæmorrhages take place into the retina. None of them are supposed to be good examples of the special form known as retinitis hæmorrhagica, though one or two are perhaps allied to it. In the latter the blood spots are almost always pointed (flame-shaped), very numerous, and many of them very small, but in the following group these features for the most part did not occur. I have been tempted to record some of them; case LXXIX for instance, on account of the absence of any clue to the diathetic cause of the hæmorrhages.

In case LXXX we seem to have an instance of which I have often noticed, the association of glaucoma with an antecedent history of long-continued liability to very severe neuralgia. I have on former occasions published several cases illustrating this, and supporting the belief that the fifth nerve takes a considerable share in the production of this curious malady. As regards the relation between the hæmorrhages and the glaucoma, we may suppose that in all probability they preceded it, and that we have in the case an example of what has been called "secondary hæmorrhagic glaucoma."

Case LXXXV illustrates a very curious group of symptoms in connection with brain disease, an important element being the remarkable ease with which the circulation was disturbed. It seemed also very probable that in one eye the central vein had been obliterated.

Cases LXXXVII and LXXXIX concern questions in connection with inherited syphilis, and case LXXXVIII illustrates the very remarkable failure of sight which occurs with sick headaches, and especially in the subjects of xanthelasma palpebarum.

No. LXXVII.—*Retinitis with Hæmorrhages in Left Eye only; Consecutive Atrophy of Optic Disc—Casts in Urine but no Albumen—History of Jaundice in Childhood and Sick Headaches ever since—No Arthritic History.*

Catherine G., æt. 57, came in December, 1871, complaining that her left eye had suddenly become dim six days before. She asserted that she noticed the defect when both eyes were open, and was confident that it had existed no longer than six days. She had no symptoms of cerebral hæmorrhage. Vision (with her spectacles) right eye, 4 J.; left eye, 20 J.

On examining her left eye with the ophthalmoscope, I found the disc and neighbouring retina swollen, opaque, and pale, the veins large and tortuous, with numerous retinal hæmorrhages near to the disc and between it and the yellow spot. Several of them were large, but none were striated. There were also patchy, cloudy, white deposits in the retina. There was a very large blood patch between the disc and the yellow spot.

Three months later (March 21, 1872) the optic disc had become pale, and its margins much clearer. The arteries were diminished, the veins large, but not larger than in the opposite eye. There were still many hæmorrhages, some of which were decolourised.

This patient's urine, examined a few days after her first attendance, was found free from albumen, but contained a good many hyaline casts of various sizes, mostly, however, small. She complained, when I first saw her, of palpitation. She had never had rheumatism. Sick headaches trouble her a good deal. In childhood she had jaundice, and had often since then had "the whites of her eyes yellow." She was accustomed to get very dark around the eyes at times, and her complexion is sallow.

No. LXXVIII.—*Hæmorrhages into Retina of Right Eye only—The Symptoms coming on a week after a rather Severe Blow on the Eye and adjacent parts—No Albumen or Casts in Urine.*

Elizabeth B., æt. 46, married, was admitted at the end of January, 1872, with defect of her right eye. The condition was shortly noted down as "a patch of white, with blotches of extravasated blood in the region of the yellow spot, right eye," and no subsequent examination was made. Her urine contained no albumen and no renal casts.

She stated that eight weeks previously she had received a blow on the right eye and neighbouring parts from a partridge, which, being thrown across the room for some one to catch, accidentally struck her. A little bleeding from the nose followed, but the eye was not painful, nor did it become "black." A week later, as she was sewing in the evening, she noticed that the right eye suddenly became dim. Neither pain nor redness followed the failure of sight, the eye remaining just the same to the date of admission.

No. LXXIX.—*Hæmorrhage into Retina of Left Eye only—The Vitreous stained with Blood—No Albuminuria.*

Richard E., æt. 44, a healthy-looking country milkman, gave a history which furnished the following notes, when I saw him for the first time. "About six weeks ago he noticed 'three or four black streaks' before the *left* eye. He tried it, and found that he could not see well. It rapidly got worse, and for a fortnight it has been as it is now. He now cannot see the 'black streaks,' only 'a dim black fog.' He can just count fingers. With the other eye he can spell out J. 1; no muscæ before it. Both pupils are large, and both very sluggish, so that scarcely a trace of movement can be observed. Neither is perfectly round. No synechiæ. He has had no pain." The ophthalmoscope showed "retinal apoplexies" in the left eye, but unfortunately I did not record any details until a week later. At the latter date the fundus had become so much obscured by vitreous opacities and general haze (hæmorrhage into the vitreous, with blood staining) as to make an accurate record of the retinal changes impossible. There were, however, numerous blood

patches of considerable size *upon* and near to the disc. His urine, examined at this date, contained no albumen.

No. LXXX.—*Painless Double Glaucoma, affecting Right Eye first, with abundant Retinal Hæmorrhages in the Left, in addition to Glaucomatous Tension, and probable Excavation of the Disc—Right Fundus not examined—History of Sick Headaches many years before, cured by going to Seaside, giving place of late years to severe Dental Neuralgia.*

George A., æt. 69, a tall thin man, dark complexion, a butcher, came to me at Moorfields in August, 1872, with abundant retinal hæmorrhages and glaucoma of his left eye, and old glaucoma of the right. Tension of the *left* was slightly increased, that of the right +2. The left had been failing for more than a year; it had not been painful, but he found strong light annoying. With his glasses he could just spell 20 J. The hæmorrhages were very abundant, dark, and abruptly defined, not striated. There was a good deal of swelling of the retina around the disc, and I could not determine quite satisfactorily whether or not there was glaucomatous cupping of the disc; probably there was a shallow glaucomatous cup. The fundus of the right could not be well seen.

He had had no pain whatever in his eyes except "a pricking sensation during east winds." The right began to be dim with "colours round flames."

Many years ago he used to suffer from very bad sick headaches, and was often bled for them. They were always cured by going to the seaside, and since he has lived at Southampton (20 years) he has had no sick headaches. He has, however, suffered dreadfully from "neuralgia" since the sick headaches left him, and has had many teeth removed for it. It never affected his eyes. He has had a little sciatica and lumbago. He knows of no arthritic history in his family.

No. LXXXI.—*Retinal Hæmorrhages in Left Eye only—Rheumatic Arthritis in the Patient and his Father—No Albuminuria.*

John C., æt. 66, a seaman, was admitted in September, 1871. Unfortunately only very short notes were kept of his case. He said that his left eye had been failing about three or four months.

With his spectacles (probably they were too weak) he saw with the *right* eye, 8 J.; *left*, 16 J.

In the *left* the ophthalmoscope showed numerous extravasations of blood in the region of the yellow spot. The urine was examined one week and again two weeks after admission, and found free from albumen on each occasion.

He stated that he had had rheumatism in his knees several times during the last seven years; his knees were examined and found to present large lips on each femur; there was also grating in each joint on movement. He had never had rheumatic fever or dropsy. His father had been subject to rheumatism in the knees.

No. LXXXII.—*Retinal Hæmorrhages in Right Eye only—No Albuminuria—History of rapid onset of Amblyopia (doubtful)—Patient's Daughter nearly blind from Infantile Choroiditis, possibly Heredito-syphilitic.*

Joseph H., æt. 66, came to me on May 22, 1871, with the story that his right eye had failed about a month before; it had, he said, improved a little for a few days after the first onset, but had afterwards again worsened, and had been for the last fortnight as bad as when he came to the Hospital. He could only see shadows with this eye; the left was good.

The *ophthalmoscopic examination* showed numerous hæmorrhages in the *right* eye only. They were to be seen in all parts of the field, but were most numerous below (erect) the disc: there were comparatively few in the yellow-spot region. The blood patches were mostly circular, but a few were striated. Besides the hæmorrhages, there were many white patches. His urine was examined a week later, and found to be pale, clear, and free from albumen. Two months later (July 24) vision was about the same (with right he then managed to count figures at 1 foot); there were many fresh hæmorrhages between the disc and yellow spot and around the latter part, but none actually at the macula itself. The blood-spots in other parts of the field were somewhat less strongly marked than at the first examination, but were no less numerous. The disc at this date was pale and the retinal vessels smaller than normal.

He had never had rheumatic fever or scarlet fever, as far as

he knew. He suffered from palpitation. One of his daughters is nearly blind from extensive choroiditis. She is possibly the subject of hereditary syphilis, but shows no other signs of it. The father denies syphilis in himself.

No. LXXXIII.—*Double Neuro-retinitis (Œdema of Disc and surrounding Retina) with abundant Hæmorrhages in the left Eye only—Xanthelasma palpebrarum.*

Mrs. G., æt. 60, admitted on May 1, 1871. She said that her left eye had been failing for about a fortnight, but that both eyes had been defective for years. As she could not read and was presbyopic, it was impossible to ascertain exactly when the amblyopia from retinitis began. Vision was very defective in each eye. When her presbyopia was corrected she saw with right eye 12 J.; left eye, 14 J.

Ophthalmoscopic Examination.—In each eye the retina was œdematous around the disc and the veins were much distended. In the left eye there were numerous hæmorrhages in the retina, chiefly above the disc (erect) and in the neighbourhood of the yellow spot. There was whitish deposit, in the form of irregular patches and streaks, in connexion with some of the blood patches; there were, however, none of the bright white dots seen in renal retinitis.

She had also two small xanthelasma spots near the left inner canthus on the upper lid.

Mrs. G. had never had gout or rheumatic fever, but was subject to slight rheumatic pains. She had not been liable to sick headaches.

No. LXXXIV.—*Double Neuro-retinitis, beginning in left and at present much more advanced in that Eye—Gradual occurrence of numerous Retinal Hæmorrhages in the left; none in right—Patient under observation for a year and a half—Chronic Rheumatic Arthritis—No Albuminuria.*

Eliza R., æt. 46, married; she is stout, of dark sallow complexion, gray irides, and almost black hair. Her left eye began to fail early in the year 1870, but she did not come to me till a year later, *February* 16, 1871. Some months after the failure began she was troubled a good deal by frontal headache and

vomiting; she had not previously been subject to sick headaches. No xanthelasma. Her right eye had begun to fail somewhat a few weeks before admission, and this brought her to the hospital.

Vision with *right eye* = 8 J. and $\frac{20}{40}$; *left eye* = 20 J. and $\frac{20}{200}$.

The following note of ophthalmoscopic appearances was made:—"Double neuro-retinitis; much more advanced in the left. Each disc hazy, the left much more so, and showing abundance of effusion. Veins of retinæ very dilated and tortuous, and the arteries look of pale colour, and in some cases show a very distinct white line along the centre. The effusion in the retina is more abundant below the disc (erect) than above it in each eye. The region of the yellow spot in each eye is hazy and whitish; in the left there is a hæmorrhage just below the yellow spot and one or two minute bright dots a little lower still." There was no colour-blindness.

The urine tested a week later and found to be pale, but to contain no renal casts and no albumen.

At the end of three months vision in *right* eye was normal, and has so remained ever since (2 J. and $\frac{20}{20}$; 1 J. with a low convex glass). The *left* eye has, however, not improved in the least, and the examinations repeated at intervals up to present date (*August* 26, 1872) have shown in it a gradual increase in the number of blood-spots and the swelling of retina. The notes of the last examination state, "Left, the disc can hardly be made out, except by the convergence of the vessels. Veins much as before; arteries can with difficulty be made out, probably from their pale colour combined with the retinal haze. There are now very numerous hæmorrhages about the disc and around the yellow spot. Those in the former position are often large, more or less completely decolourized, and are frequently situated over veins. Those about the yellow spot are punctate, and for the most part dark coloured. *Right eye* much as at first: disc a little pale; surrounding retina œdematous; no hæmorrhages; veins congested and tortuous.

Fifteen years before I saw her, and three weeks after her fifth confinement, Mrs. B. had an attack of what she called "rheumatic gout" in her right upper extremity; it affected the hand most severely, and lasted about a fortnight. Since then she has often had similar but milder attacks in the same hand and shoulder;

the hand becoming swollen. She often also has aching and stiffness in the knees, and on examining these joints I found crackling, synovial thickening, and, in the right, lips on the femur. I could not detect changes in any other joints. During her earlier pregnancies she suffered much from toothache and "gum-boils," and had many teeth extracted. She is subject to stiff neck and to sudden attacks of sharp pain in the loins followed by stiffness. She does not know of any arthritic complaints in her relatives, but as she does not know nearly all of them, there is much room for fallacy here.

No. LXXXV.—*Atrophy of Discs and great Diminution of Retinal Arteries, the vein in one turgid, in the other nearly invisible and substituted by a Network of (?collateral) small vessels on the Disc—History of Bleeding from Throat from slight cause (coughing)—Subsequently two attacks of Temporary Blindness, one of the Right Eye for six weeks, the other of both Eyes for only an hour—Later, attack of threatened Right Hemiplegia, leaving some permanent Numbness, &c., and followed by gradual Failure of Sight in both Eyes and by Deafness of Right Ear.*

Captain W., æt. 59, came to me in October, 1872, on account of his sight. With his right eye, he could only see shadows at the upper and outer part of the field; with the left he could see 18 J., but only to the temporal side. The pupils were of normal size, and moderately active. Ophthalmoscopic examination disclosed a curiously dissimilar state of the discs. Both were gray-white and atrophic; in the *right*, the central vein was large and the artery small; but in the *left*, the chief vein could only just be distinguished, and the artery could not be detected at all, while the disc itself in this eye was covered by a beautiful network of minute tortuous vessels, some of which were varicose in parts. The obscurity of the vena centralis was partly due to these small vessels lying over it, partly to a great reduction in its size. There were no retinal changes except here and there streaks along the vessels.

The patient is a retired sea-captain; he is a very stout, florid man, with dark hair, short neck, and of middle stature,—a very "punchy" man. The blood always rushes to his head if he stoops; "the least thing makes him as red as possible." The

history of his eye and other head symptoms extends over several years, and is very curious and interesting.

Six years ago, on coming ashore from a vessel, after an accidental cough from walking fast, he had hæmoptysis. The doctor who attended him said the blood was not from his lungs but from his throat. He continued to spit a good deal of blood (rarely less than a teacupfull) each day for a fortnight. The bleeding came on if he got excited or talked much. He attributes the first bleeding to a single violent cough, and probably the blood came from the rupture of one vessel. He had no bleeding from the nose and no headache. He kept the house a fortnight for that attack. A few months later the sight of his right eye failed almost completely; he thinks it was nearly blind: He was under M. Desmarres' care at Paris, and in about six weeks regained the sight almost perfectly. On another occasion, *three years ago*, he stooped for a few minutes over the side of a vessel, to examine the damage done by a collision, and on raising his head found himself in a mist, and had to be led ashore. In about an hour the sight returned, but again failed almost completely, whilst he was on his way to the doctor's a little later in the day. He was under treatment for several months, and got slowly better, but never quite well. A third time, *ten months ago* (in December), he was suddenly attacked by prickly feelings and numbness in the right side of his body, arm, and hand, but not in the leg. This was accompanied by loss of memory and noises in the right ear, but he never lost consciousness. He was bled freely after this attack. Gradually since then his sight has failed in both eyes. He has regained his memory, and does not now have the numbness, &c., in his right arm, but complains that his right buttock becomes numb and "cold" if he sits for long; the coldness is subjective only. It should be mentioned that before the attack he had been slightly deaf in his right ear for several years; the deafness has greatly increased since December, and he has an increasing noise in the ear. With the left ear he hears well. Of late he has been liable to fall asleep on all occasions, but he thinks it is simply because he does not see the gestures of the persons he is talking to. Formerly for many years he was subject to attacks of "erysipelas," usually twice a year. They ceased about ten years ago, and since the first failure of sight, he has never had any. The "erysipelas" used to begin in the legs and pass

upwards to his head. His face became enormously swollen and disfigured, and his eyes were closed. There were some watery vesications. The attacks usually lasted ten days, and were followed by desquamation, "peeling like a cuckoo," and great itching. Captain W. says that he never had a headache in his life, at least not since boyhood. He has always been liable to perspire freely, especially about the head. Formerly he suffered much from hot feet, but now they are often cold. He is the only child of his parents: his father died at 63 of dropsy, his mother died young. When I saw him his urine was normal; specific gravity 1030, and contained neither albumen nor sugar; there was no deposit at all. His bowels were regular.

No. LXXXVI.—*Paralysis of Portio Dura of right side, with Deafness occurring suddenly—Paralysis of Lachrymal Gland and Temporary Paralysis of Lower Extremity on same side—Slight Defect of Sensation on same side of face—No Pain.*

Mrs. Sophia Cobbins, æt. 34, is the subject of complete paralysis of the right portio dura. She cannot move her face in the least on that side nor shut her eye. Her hearing is absolutely lost on that side, and, as she believes, her taste. Her tongue feels, she says, always as if scalded on that side. No tears ever flow when she cries. The symptoms came on suddenly one night, two days after her last confinement. She had had a favourable time, and was considered to be getting on well; but she had been previously for nine months under care at St. Bartholomew's Hospital. She then had dreadful giddiness, and used to stagger in walking.

After the night during which she lost the portio dura she had also defect in the right leg. It used to twist under her and feel weak, and for more than a month she could not stand. For years she has been liable to have her feet "die with cold," never her hands.

She can feel in all parts on the right side of face, but not so well as on the other. The slight defect of sensation seems equal in all parts. There is no subjective numbness, and no pins and needles. The light is annoying to her.

Her sight has failed lately. She is very susceptible to light. Atropine acted well. The discs are red, but no abnormal changes

are noticed. Mrs. C. is pale and feeble. She is now nursing a healthy infant.

No. LXXXVII.—*Choroido-Retinitis as the result (possibly Intra-uterine) of Hereditary Syphilis—Resemblance in some points to Retinitis Pigmentosa—Important History of a Syphilitic Family.*

Alice Barrett, æt. 8 years, was brought to the hospital by her father on account of oscillation of globes, with defective sight. There was nothing in her aspect to lead me to suspect syphilis, but on my examining her teeth, which were of the "mercurial type," her father volunteered the statement that she had suffered in infancy from the "disease from her mother." It appeared that both parents had suffered from syphilis 15 years ago, and had secondary symptoms. The father, who now appears to be in perfect health, got rid of the disease in six months, but his wife continued to suffer, more or less, for years, and is now in an asylum with symptoms which possibly indicate syphilitic brain disease.

After the syphilis there were two live births, and two miscarriages before the birth of our patient, who, being now eight years old, was born eight years after the primary disease in her parents. The two infants alluded to as live births, both died very young, one a few hours, the other three weeks old.

Our patient suffered from "a severe peeling rash" during the first months ("her feet all peeled") but afterwards got a clear skin. It was suspected that she was blind, and the oscillation was noticed almost from the first. At the age of three years, she having been throughout "a delicate little thing," she had a brain attack, was very delirious, and was believed to have a tumour on the brain. She was ill two or three months, and then got well, but remained thin and weakly. She has had no recent symptoms, excepting occasional attacks of pain in the right eye.

On examination with the ophthalmoscope, I found evidences of extensive choroido-retinitis in both eyes. The discs were rather pale, hazy, and waxy-looking, and the arteria centralis in each much diminished. In the central parts of the fundus, a few small round specks of brown pigment were seen at wide intervals, and usually surrounded by an ill marked patch, where

the epithelium was absorbed. Towards the periphery these patches increased in numbers, and there occurred large groups of white spots, like worm-eaten cloth, where the choroid was disorganised. There were a few very large pigment accumulations, and many groups of small dots and lines, exactly like those of retinitis pigmentosa. Her hearing is good, and she has had no keratitis. Her head is large, but not of the characteristic form most usual in heredito-syphilis. The twitching of her globes rendered minute examination difficult. In addition to the features mentioned above, I noticed in one or two places very peculiar long red streaks, which I could not interpret.

Since the birth of this child, two miscarriages and two live births have occurred. One, a girl, is three years old, and has had no suspicious symptoms; the other is an infant of seven months old, and is now covered by a bad rash, and not expected to live.

The following date-table will give a clear view of the family history:—

1859. Syphilis acquired by husband, and communicated to wife. Both suffered severely, but the father got perfectly well, and has remained so ever since.
1860. A child born dead.
1861. A child born, which lived three weeks.
1862.
1863. A miscarriage.
1864. A miscarriage.
1865.
1866. The patient (a girl) born, supposed to be blind; had a severe infantile rash. Æt. 3, meningitis.
1867.
1868.
1869. A miscarriage.
1870. A girl born, still living; free from symptoms.
1871.
1872. A miscarriage.
1873. A boy born; at present seven months old. Covered with rash, and not likely to live. Mother, after much ill health, the subject of brain disease, and in an asylum.

No. LXXXVIII.—*Additional Particulars of a Case of Xanthelasma Palpebrarum, with Blindness of one Eye.*

The following notes are in continuation of a narrative published in vol. vii, page 275. I have been able to give some additional particulars as to the kind of headaches, &c., from which the man had suffered, and also to carry the account of the eye symptoms four years further.

The case is an example of the very peculiar and rare form of loss of sight which occurs in those who are the subjects of xanthelasma, and liable to severe bilious headaches.

In my report on xanthelasma palpebrarum I have especially mentioned this liability, and since that Report was published (see "Medico-Chirurgical Transactions"), several additional cases have come under my observation. I have not, however, seen any quite parallel to the following, in which the blindness (in one eye) has been permanent.

William Savage, æt. 49. He attended me at the Ophthalmic, from April 19, 1869, to July 19, and, being no better, then left off. He had, however, regained sight in the right eye from bare perception of shadows up to being able to make out letters of No. 20, when he held the book to his right side. This note was made on May 10. He then complained of occasional mist before the left eye.

During the four years since his last attendance, he has not been under any medical care. He has had fewer headaches, and not such severe ones as formerly. He has had headaches, but has never been laid up by them. He often wakes with a dreadful headache, but usually can relieve it by a cup of tea. On several occasions, six or eight times, he has lost the sight in the left eye. The attacks have never lasted more than three or four minutes, and usually in ten minutes he can see as well as ever. Often he has attacks of partial blindness, during which he cannot see the lower half of an object. He has had rheumatic fever four times; has never had jaundice. The headaches have often been morning ones. He would, he says, often wake up with a headache, of dreadful severity, and with perspiration pouring from him. The

perspiration was not only from the head and face, but from the shoulders also.

His severe headaches began at æt. 28, two years after his marriage, and soon after his first attacks of rheumatic fever. His father suffered much from liver complaints, and bad headaches; he took much medicine, was often under doctors, but lived to 75. Six or seven years ago, whilst at work, he was suddenly seized during a headache by an attack of "twitter," which ran down the left side, limbs, face, and trunk. He thought he was going to be paralysed, and at once left his work, and got a little brandy, when it passed off.

He is of dark complexion, florid, and healthy looking; he suffers extremely from cold feet; is a bad sleeper, and often is two or three hours before he gets to sleep; dreams much; bowels usually regular, but he finds that aperients are very necessary to keep off his headaches; has never lived out of London, and is by occupation a gold-beater; has been accustomed to smoke all his life a little. His impression is that smoking did his headaches harm rather than good. He attends now (October, 1873) because his left eye has become more dim, and has had threatening headaches recurring every morning, and attended by severe perspiration, as happened before he lost the right.

Atropine has acted but slightly. His xanthelasma is much as it was. The patches are plentiful on left side over inner canthus; on right side they occur at both canthi, but are very small.

He still has perception of shadows on the temporal side with right eye. The disc of this eye is white and atrophied, presenting a shelving cup in the side next the yellow spot. Its large vessels are very much reduced in size, the artery being traced with difficulty. The disc of the left eye is, excepting slight and doubtful pallor on the side next yellow spot, of healthy appearance, and its vessels are of good size.

The following points may be especially noticed as regards his headaches. They have been sometimes limited to one side of forehead, and sometimes to a single spot, at others the whole forehead, or even the entire head, has been affected.

He has been very apt to wake with one. Often they have been relieved by tea, or by a walk in the fresh air.

When bad they have been attended by profuse sweating. They have always been worse if the bowels were not freely open.

They have been attended by remarkable liability to cold feet. The liability to them appears to be inherited, his father having suffered from similar symptoms.

He does not think that they have been materially influenced by sexual causes, but admits that he has not been "a very strong man," and that his liability to headaches did not show itself much before his marriage.

No. LXXXIX.—*Symptoms of Inherited Syphilis in Infancy with Opaque Lens and others Changes in one Eye—Keratitis of the other Eye at the Age of Thirteen—Absence of the usual Physiognomic indications of Inherited Taint—Important preservation of Written Evidence—Deafness and Epilepsy—Nodes on Long Bones.*

The following case is of much interest in reference to the recognition of the subjects of inherited syphilis, and to the diseases of the eye which are in connection with that cause. When the girl, who is its subject, came to me at the age of 13, she had keratitis of one eye and very unusual changes (old) in the other. Neither her teeth nor her physiognomy indicated syphilis, and as both parents were healthy and there was no history of suspicious symptoms to be got from them, anyone believing that interstitial keratitis of the typical form can occur independently of inherited taint, might have claimed the case as one in support of his opinion. Fortunately, however, the child's mother had preserved an old hospital letter which in Mr. Dixon's hand writing recorded that in infancy the patient had been treated for inherited syphilis. This was conclusive, and this fact being established, we are now entitled to attribute to this special cause all the conditions of disease which the patient displays.

Cath. Ellis was treated by Mr. Dixon during infancy for disease in the left eye. She had also at the same time (æt. 4 months) symptoms of inherited syphilis, snuffles, eruptions, peeling of soles and palms. The pupil of the left eye was largely dilated, and the lens hazy. Mr. Dixon's notes of the case extend

from Nov. 24, 1856, to Dec. 1857, and during much of this time she took small doses of grey powder.

The girl was brought to me in June, 1869, with keratitis of the right eye. I excised the left eyeball, and afterwards she remained under treatment from 1869 to 1872. The cornea never well cleared. In the summer of 1872 she had a node form on the right tibia, and one also on the right humerus. At this date she was much troubled by unusual sleepiness.

In September, 1873, she had her first epileptic fit. It occurred during sleep. After this she had several minor fits, and one severe one. She complained of being always tired.

In December, 1873, the question of the propriety of doing an iridectomy was raised. The object proposed was to get a pupil opposite a clear part of the cornea, as the middle remained very hazy. She could make out No. 13 after use of atropine. The anterior chamber is large; all the central parts of the cornea clouded, periphery clear. No iritic adhesions. I could not manage to see the fundus.

The exact nature of the disease which destroyed the left eye is somewhat uncertain. When she came to me twelve years later, the iris was quite lost by retraction, and the lens, dense white, could be seen reposing in a yellow-grey bed a little to the outer side of the middle of the fundus. The vitreous was clear, but the choroid and retina were wholly disorganised and replaced by a dense yellow structure. The displacement of the lens, assisted by the entire removal of the iris, allowed me to see the fundus without optical aid. I much regret that I have misplaced my notes of the examination after removal.

When her deafness was coming on her hearing varied much from day to day. She had almost constant noises in the ears.

Her father is living, and believed to be in excellent health.

Mother the same. Neither parent has had any illness since marriage. They were married 18 years ago, and the following is a list of their children:—

1. F., 17, the patient, born a year after marriage. Infantile symptoms of syphilis. Loss of left eye. Keratitis of right at æt. 12. Deafness at æt. 16. Epilepsy at æt. 17.
2. M., 15, born two years later. He is healthy, and has had no keratitis. Liable to "stoppage in nose."

3. F., 7, one of twins (the other dead born). In good health. No miscarriages.

In all probability the taint in this case was derived as is usual from the father. It will be seen that it soon apparently ceased, and that the first child only (born within a year of marriage) showed symptoms. The mother, whom I have often seen, is apparently in excellent health, and asserts that she has always been so.

I have little doubt that the disease which destroyed the left eye in infancy was one of those rare forms of chororditis with free lymph effusion which are now and then met with in young children, and are apt to be mistaken for tumours. There is the yellow or metallic glare from the fundus, the dilated pupil, and, if left long enough, the secondary cataract. I have several times excised such eyes, expecting to find on dissection a new growth, and found only the results of inflammation. Such eyes are indeed rarely left, as in this case, to go through their final changes. Those changes were absorption of the fluid effusion and matting together of choroid and retina in a dense yellow membrane, with dislocation of the opaque lens, and disappearance (by retraction) of the iris. In this case probably the syphilitic taint was the cause of the effusion, but I have seen other similar ones where no history of that cause could be made out.

ON THE TREATMENT OF CERTAIN AFFECTIONS OF THE EYE BY MEDIAN INCISION OF THE CORNEA.

By T. Pridgin Teale, M.A., F.R.C.S.,

Surgeon to the General Infirmary at Leeds.

The object of this paper is to advocate a method of dealing with certain acute disorders of the eye, which, for wide range of applicability and constancy of result, seems not unlikely to rank as second only to iridectomy, as a means whereby we may rapidly, often instantaneously, relieve intolerable pain, arrest the progress of formidable disease, and preserve the eye from irreparable damage.

The principle of making an incision through the cornea into the anterior chamber has already been established in abscess of the cornea* (Bader), and in *ulcus corneæ serpens*† (Saemisch); and the value of *median* incisions of the cornea has been urged by M. Lebrun‡ in the extraction of cataract. It does not, however, appear to have attracted the attention of ophthalmic surgeons as much as it deserves, nor to have been established as a broad rule of treatment capable of such a wide range of application as I propose in this paper.

The following principles seem to be indicated by the cases in which I have tested the operation during the last year and a half.

* Bader, on Diseases of the Eye, p. 169. "Opening of the abscess (corneal) by incision has proved of great advantage in cases in which no perforation has occurred. This little operation consists in thrusting the point of a cataract knife close to the suppurating part, through the healthy cornea into the anterior chamber, carrying it on so as to make an incision through the largest diameter of the suppurating portion, and bringing it out again in the healthy cornea."

† Williams. Report of 4th International Ophthalmic Congress, p. 102. "Saemisch's free incision splitting the ulcer is still more effectual than simple paracentesis. To secure thoroughness and permanency in its effects, the incision should be made freely, and the wound sprung once or twice a day for a week or more."

‡ Lebrun, on New Mode of Operating for Cataract by Median Spherocylindrical Flap. Report of 4th International Ophthalmic Congress, p. 205.

a. That suppurative affections of the cornea and iris, which do not rapidly yield to atropine and opiates, ought to be dealt with by *direct incision through the median part of the cornea into the anterior chamber,* just as much, as a matter of course, as one would incise a whitlow or a thecal abscess.

b. That such an incision may be made crucial or T-shaped, if it be thought desirable that the wound should not heal up rapidly, thereby avoiding the necessity of "springing the wound once or twice daily for a week or more." Williams, *loc. cit.*

c. That an incision near the centre of the cornea, in length about one-third of its diameter, passing *vertically* through the lamellæ into the anterior chamber, does not as a rule produce any serious damage to the cornea by way of opacity, nor to the iris by way of prolapse or synechia anterior. Vide Cases II, IV, V, VI, IX, XI.

d. That in hypopyon a median incision of the cornea gives exit to pus and purulent lymph lodged in the anterior chamber more readily, certainly, and completely than a marginal incision. Vide Case VIII.

e. That an incision into the anterior chamber, through suppurating cornea, can arrest destructive suppuration and sloughing, where iridectomy has been already employed unsuccessfully. Vide Cases I, IV.

f. That on incising in its early stage a circumscribed abscess in the layers of the cornea, a small white body sometimes escapes from the opaque spot, which, when placed under the microscope, proves to be broken down corneal fibre, infiltrated with pus corpuscles. Bader (p. 169) has observed that the opaque material forming hypopyon often contains *débris* of corneal tissue, but I am not aware that the corneal slough escaping from the incised spot, *like the core out of a boil,* has been identified. Vide Cases I, II, III.

Operation.—The patient having been put under the influence of an anæsthetic, an incision, in length about one-third of the diameter of the cornea, and penetrating the anterior chamber, is made by a Graefe's knife. The incision should be

made *not valvular*, but *vertical to the curve of the cornea*, traversing " in its longest diameter (Bader)," any abscess or specially diseased portion of cornea, and tending towards the pupillary portion of the cornea, where the risk of prolapse of the iris will be least. When the site or direction of the incision is not determined by a specially damaged spot, it is better to carry it across the middle of the cornea, slightly *above* the centre of the pupil. This suggestion to avoid the centre of the pupil is made, because I have not yet been able to ascertain whether an incision such as I have described can be made across the centre of the healthy cornea without impairment of vision.

It is often well to provide against too rapid closure of the wound by making it conical or T-shaped. As this second step cannot easily be made by Graefe's knife without risk of injuring the lens, it is safer to make the cross cut by iridectomy scissors.

CASE I.—*Abscess of Cornea—Failure of Iridectomy—Immediate relief from Incision—Escape of Slough from the Abscess.*

Mrs. Windale's child, Darlington, æt. 11, a patient of Mr. Arrowsmith.

Right eye. Central two-thirds of the cornea opaque from sloughing, &c.

February 11th, 1873. An iridectomy, letting out purulent lymph, with aqueous humour. Gradual improvement.

December 3rd. There is central haziness of the cornea.

July 22nd, 1874. Slight opacity; reads 20 at 1 foot.

The *left eye* having commenced in like manner with the right, the boy was brought to me again on March 1st. A nearly central white spot had formed in the cornea, which was increasing, and caused most acute pain. Fearing a result like that in the right eye, I immediately performed iridectomy, in hopes of arresting the threatened abscess.

March 7th. As the disease was increasing, and the symptoms were not in any way mitigated by the iridectomy, the pain being most distressing, I put him under the influence of chloroform, and made a crucial incision through the opacity, penetrating the anterior chamber. On the first incision being made,

pus escaped with the aqueous humour; on the second, a round body, of the size of a hemp-seed, was enucleated from the corneal opacity, which, when examined by the microscope, proved to be corneal tissue infiltrated with pus.

The relief to pain was immediate; and his improvement was so rapid, that in five days he was able to return home to Darlington.

December 3rd, 1873. There is hardly a trace of central opacity, or of the incision.

July 22nd, 1874. Synechia anterior (?); reads 6 at 7 inches.

CASE II.—*Abscess of Cornea — Hypopyon — Crucial Incision— Escape of Corneal Slough.*

Mrs. Gill's child, æt. 4, a patient of Mr. C. Richardson, of Leeds.

Right eye had been inflamed three weeks. There is a whitish spot in the centre of the cornea and hypopyon.

July 12th, 1873. A crucial incision was made through the opacity, penetrating the anterior chamber. On the first incision being made, a white substance escaped with the aqueous humour, probably the pus of the hypopyon; on the second, another smaller white body, which seemed to have been adherent to the posterior surface of the cornea. The first substance, under the microscope, showed very little definite structure; the latter showed corneal fibres, infiltrated with pus.

July 21st. Going on well. Has had much less pain since the operation.

July 16th, 1874. There is a leucoma resulting from the abscess, across which a *thin* white line, indicating the incision, is visible. No synechia anterior.

CASE III.—*Corneal Abscess and Hypopyon—Incision and Escape of Corneal Slough.*

Patrick Culican, æt. 40, a patient of Mr. Oglesby, in the Leeds Infirmary.

Left eye had been ailing ten weeks, and during the last three weeks his sufferings had been so great, and his strength so much reduced, that he was made an in-patient March 2nd, 1874.

March 8th. Finding central corneal opacity and hypopyon, Mr. Oglesby made an incision through the centre of the cornea and of the opacity, and gave exit to a round, very distinct body, of the size of a small pea, which was distinct from opaque matter of the escaping hypopyon, and was of such consistency that it appeared to be capsulated, and could be handled by forceps. Unfortunately, it was not examined by the microscope. Relief to pain was immediate.

March 10th. No pain; cornea bright.

June 27th. Opacity clearing.

CASE IV.—*Circumscribed Corneal Opacity—No relief from Iridectomy—Rapid improvement after Median Incision.*

Mrs. Wathen's child, æt. 3. January, 1873. The *left eye* began to inflame, and rapidly growing worse, with the formation of central opacity of the cornea; an iridectomy was performed.

March 10th. No improvement having resulted from the iridectomy, a crucial incision was made through the opaque part of the cornea. There was no hypopyon, and no pus was seen to escape. After the incision, rapid improvement set in.

June 14th, 1874. Pupil visible through bluish opacity. No trace of the crucial incision except four dots of pigment. No synechia anterior.

CASE V.—*Circumscribed Abscess of Cornea—Crucial Incision.*

Mr. S., patient of Mr. Wm. Hall, Leeds, consulted me February 15th, 1873, on account of an apparently superficial affection of the cornea, attended with much ciliary congestion. Treated by atropine and turpentine.

March 12th. The eye had steadily become worse, and the pain was intense, disturbing his rest at night. A white spot had formed near the margin of the cornea. A crucial incision was therefore made into the opaque spot, giving exit to aqueous humour and a small quantity of pus. A white slough being adherent to the cornea, was not removed at the operation.

The puncture gave great relief, and he said "he began to mend straight away."

June 22nd, 1874. Cornea opalescent at the seat of the

abscess. *No synechia anterior.* No trace of the incision to be detected, even by a $+2\frac{1}{2}$ lens.

CASE VI.—*Diffuse Keratitis, double—Right Eye treated by Iridectomy, Left by Corneal Incision.*

A. W., æt. 13, suffering from specific diffuse keratitis of left eye, of three weeks duration. Central third of cornea opaque, outer two-thirds dull red.

June 10th, 1873. A T-shaped incision of the centre of the cornea.

A month later the right eye became affected in the same way, the disease progressing still more rapidly.

July 23rd. Iridectomy of right eye.

June 23rd, 1874. Both eyes had become slowly quiescent after the operations. The *left* cornea, treated by incision, was the best of the two, the outer two-thirds having regained transparency, the centre being dotted with streaky opacities. Vision, nearly counts fingers. Good anterior chamber. No trace of incision visible. *Right* cornea clearing at the margin. Vision, shadows.

This case is valuable, not from any distinct improvement to be traced to the operation, but as showing absence of synechia anterior, and of trace of the crucial incision.

CASE VII.—*Ophthalmitis caused by Iridectomy, with Wound of Lens, arrested by T-shaped Incision.*

Mrs. L., æt. 62, was iridectomised for glaucoma five weeks before I saw her. The operation gave no relief, but caused increased suffering, owing to suppurative iritis, the result probably of wound of the lens during the operation. There was hypopyon, and the area of the pupil and iridectomy was filled with pus. She was almost worn out by the pain and the sleepless nights of the previous five weeks.

April 4th, 1874. A T-shaped incision was made, opening the anterior chamber in the centre of the cornea. Relief to pain was immediate. "She entered the house in pain, and went out easy," and had good nights ever after until a relapse of pain at the end of April, when Mr. Oglesby, in my absence from home, repeated the incision across the middle of the cornea, after which

the pain gradually subsided, though less rapidly than on the first occasion.

CASE VIII.—*Ophthalmitis after Extraction of Cataract arrested by Median Incision.*

Peter Hall, æt. 68, of shaken constitution, had a cataract extracted by myself, March 11th, 1874. Eight days after, iridocylitis set in, causing closure of the pupil, constant pain, and bad nights.

May 14th. Finding the cornea hazy, and the conjunctiva swollen, and of a deep red colour, I made a T-shaped incision across the middle of the cornea.

May 22nd. Eye quiescent; conjunctiva nearly natural; two-thirds of the sclerotica white. Has had good rest nearly every night since the operation, aided on three occasions by opiates.

July 4th. Line of incision to be detected by a $2\frac{1}{2}$ convex lens as a fine white line only.

CASE IX.—*Suppuration of Cornea from a Blow—Median Incision.*

Henry Storr. The right cornea was injured by a piece of mortar which fell from the ceiling as he was looking upwards. November 23rd, 1873.

December 7th. A cloudy opacity of the cornea, and hypopyon. Has had hardly any rest at night since the accident. No improvement from the use of atropine. A T-shaped incision of the cornea into the anterior chamber. "He had good nights ever after." The eye rapidly recovered. No synechia anterior, but a white line indicating the position of the incision.

CASE X.—*Suppuration of Cornea from a Blow—Median Incision.*

Charles Plummer, æt. 49, was admitted into the Leeds Infirmary, April 20th, 1874, with corneal opacity and hypopyon, the result of a blow on the eye by a stone a month previously. He had suffered intense pain, and could not rest at night.

April 22nd. An incision was made across the centre of the opacity, and a second cut was made by scissors at right

angles to the median termination of the first. After the first incision, the mass of purulent lymph escaped with the aqueous humour.

May 11th. Cornea clearing. After the operation he had uniformly good nights, and lost his pain.

Case XI.—*Extensive and severe Suppuration of Cornea arrested by Incision.*

Henry Walworth, æt. 58, was admitted into the Leeds Infirmary, under the care of Mr. Oglesby, with severe keratitis on April 23rd, 1874, and was treated for five days without any relief by leeches, belladonna lotion, and opium in full doses.

April 27th. Pain intense. A small central portion of opaque cornea was just visible between the folds of overlapping chemosed conjunctiva. Mr. Oglesby made a horizontal incision through the cornea, letting out a large quantity of pus, and giving immediate relief to the pain.

May 5th. Chemosis gone.

May 8th. Upper half of the cornea bright.

July. A diffuse but not dense opacity over the pupil. No synechia anterior. Scar of incision hardly perceptible.

Concluding remarks.—The foregoing cases go far towards proving the main points of this paper, viz., the comparative harmlessness of a median incision into the anterior chamber, as far as opacity of the cornea and embarrassment of the iris are concerned, the great power of such an incision in arresting acute affections of the cornea, and the extensive range of disorders in which this treatment can be beneficially employed. May we not hope that the same treatment may prove to be of equal value in threatened sloughing of the cornea from purulent ophthalmia, in the exceptional cases of glaucoma which iridectomy fails to relieve, and in most acute affections of the eye which threaten the vitality of the cornea?

REPORTS OF VARIOUS CASES.

By Charles Higgens, F.R.C.S.,

Assistant Ophthalmic Surgeon, Guy's Hospital.

Case I.—*Recurrent Ulceration of Cornea in both Eyes.*

Sarah Nash, æt. 55, a married woman, came to the Royal London Ophthalmic Hospital, July 8th, 1872. The patient had always enjoyed good health; had four living children, the youngest 16 years of age; all were healthy.

Since her last living child was born she had had five miscarriages, each at about the third month, the last being seven years ago.

Patient presents no symptoms of syphilis, and with the exception of the miscarriages, there was no suspicious history; there was no history of gout or rheumatism, hereditary or personal.

She had been subject to attacks of inflammation in both eyes (sometimes one only being affected, at others both) for the last 15 years. She said that the inflammation always appeared to her to be of the same character; it usually came on at intervals of about three or four weeks, the attack lasting as many months. There was severe smarting pain, profuse lachrymation, and great intolerance of light. During an attack she had good and bad days; perhaps at the beginning of the week being pretty well, and towards the end as bad as ever again.

At the present time (July 8th) the attack has lasted about a week. There is extreme photophobia, much lachrymation, and the peculiar smarting pain. On opening the eyes (which is attended with much difficulty) there is a crescentic patch of ulceration at the upper border of the cornea in each eye; the surface of the ulcer is opaque and looks rough; its edge, which is irregular and marked by whitish-looking patches, of almost calcareous appearance, extends about two-thirds of the way to the upper margin of the pupil. There is a well-marked arcus seen through the ulcer at the upper margin of the cornea, and

existing also at the lower margin; the iris is healthy and the pupil normal. There is much injection of the ocular conjunctiva (a portion of the opaque chalky-looking material examined under the microscope showed only epithelial scales and debris). Ordered atropine and sulphate of zinc drops.

Aug. 1st. Slight improvement.

Aug. 12th. Worse than ever. Chloride of zinc was substituted for the sulphate of zinc in conjunction with the atropine, and she was ordered a mixture containing sulphate of iron and quinine.

Sept. 19th. No improvement. The drops were continued, and colchicum and iodide of potassium given internally.

Sept. 30th. No improvement. Alum and bella-donna lotion was ordered, and an ointment of one part of nitric oxide of mercury to four of lead; a small piece to be placed on the conjunctiva of lower lid at bed-time. A quinine mixture was given, and a blister ordered to be applied to each temple.

Oct. 10th. There is considerable improvement: the injection of the conjunctiva has disappeared, the intolerance of light gone, and the pain much less; the ulcers appear to have nearly healed, and their margins have receded from the pupil.

Oct. 17th. Both eyes ulcers vascular; the large loops of the conjunctival vessels being plainly visible, passing for a short distance over their outer margins, the rest of the surface of each ulcer being traversed by innumerable quantities of very minute vessels; there is much intolerance of light, watering, and smarting pain.

Jan. 13th, 1873. Ulcers have entirely healed, there being a dull white cicatrix gradually shading off into transparent cornea, marking their former situation.

Remarks.—This peculiar form of ulceration is perhaps more properly described as ulcus corniæ serpens; the term recurrent certainly calls attention to a very prominent symptom in the above case. Relapsing ulcer would also be an appropriate name. In a somewhat similar case, at present under treatment in Guy's Hospital, the affection has been marked by constant relapses. This patient is the subject of syphilis, and had at the time of admission sore throat and a

scaly eruption. Treatment seems to be almost powerless against this form of ulcer; it appears to spread in spite of everything, but as a rule does not involve more than half of the cornea. In exceptional cases it attacks the lower margin of the cornea as well as the upper, and then the two ulcers, spreading upwards and downwards, will render the greater part of the cornea opaque, a partially clear portion being left in the centre. Such has been the case in the right eye of the patient at present under treatment in Guy's Hospital.

CASE II.—*Syphilitic Iritis in an Infant.*

Ada Kummeroff, æt. 8 months, brought to the Royal London Ophthalmic Hospital, February 6th, 1873. Mother stated that child was perfectly healthy till within the last two months, since which time it had suffered from cough, wheezing in the chest, and snuffles. Mother had been married two years; had never had a miscarriage or other child, and with the exception of two attacks of rheumatic fever, the first eight and the second five years ago, had always enjoyed good health both before and since marriage. The child's father was said to be quite healthy. Attention was first called to the child's right eye, three weeks ago, from the mother noticing a white spot above the pupil; this was pointed out to a medical man who was treating the child for a cold.

At present time, February 6th, 1873, the child gives no sign of pain or discomfort, there is no intolerence of light, but the right eye waters a good deal, and there is some slight injection of the conjunctiva. The iris is cloudy, somewhat swollen, the colour is altered (that in the fellow eye being blue), the pupil is moderately contracted and oval in shape, its outline irregular, and there is considerable posterior synechia; there is a large nodule of lymph upon the surface of the iris, above the margin of the pupil; the pupil is pressed downwards by the lymph nodule, the cornea is clear.

The child is well nourished, and with the exception of the iritis and a rather square forehead, presents no sign of congenital syphilis. (It has no teeth.) The mother appears healthy.

A grain of grey powder was ordered night and morning and belladonna lotion to be constantly applied.

Feb. 17th. Lymph nodule had increased in size; there was an abcess in the lower lid of left eye, which was opened, and dead bone felt at lower margin of orbit. The powders were continued, and steel wine and cod-liver oil ordered twice a day.

Feb. 27th. An ulcer has formed at upper margin of cornea, cornea ruptured during examination, and large prolapse of iris occurred. There is a conical elastic swelling in front of neck (glandular?). Treatment to be continued; eye to be kept bound up.

March 6th. Large staphyloma at upper margin of cornea. (Treatment the same.)

March 13th. Staphyloma removed with scissors; found to communicate with vitreous chamber, and consisted of portion of iris thickly coated with lymph.

In beginning of July, 1873, the child came under my treatment at Guy's Hospital.

July 14th. Iridectomy performed in right eye; the iris much atrophied and very rotten; only a small portion could be got away. The tension of eyeball good; a small bulging cicatrix marks position of previous staphyloma at the upper margin of cornea.

Aug. 4th. A cicatrix in position of the abscess, opened Feb. 17th, is causing ectropion of left lower lid; cicatrix dissected up. Some dead bone removed from lower margin of orbit; lids united for about one-third of their extent, beginning at outer canthus.

Aug. 15th. Firm union has taken place between the margins of the lids; there is no tendency to eversion; the child sees well through the inner two-thirds of the palpebral aperture.

Case III.—*Syphilitic Iritis in an Infant*

Joseph Nurry, æt. 2 months, was brought to the Royal London Ophthalmic Hospital, March 10th, 1873.

The child had never been well; since birth had constantly suffered from snuffles; when a fortnight old the feet and legs were much swollen. The mother was told by a medical man that the child was suffering from dropsy; the swelling lasted till

within the three last weeks, but has now entirely disappeared; no eruption has been noticed on any part of the body. The mother has been married 15 years, and enjoyed good health both before and since marriage; presents no sign of syphilis, and denies having ever suffered from anything of the sort; has had eight children all born alive, and with the exception of two, the fourth and seventh, all are now living; the fourth, a girl, three years old, died from abscess in the side; the seventh, a boy, died at 11 months from convulsions. All her children have had snuffles in infancy, lasting until they were about six months old, and then getting well spontaneously. The eldest child, a boy 14 years old, the mother states, is crippled from some affection of his joints; all the remaining children, with the exception of the patient, are said to be quite healthy. (All have been vaccinated, and lymph has been taken from all to vaccinate other children.) The father is said to be a healthy man.

At present time (March 10th) the child appears fairly nourished; it has snuffles badly; there are a few copper-coloured spots on the left side of the nose, and elsewhere about the face, otherwise the skin is clear; there are no sores or condylomata about the anus.

There is iritis in both eyes, but the child does not appear to suffer pain; there is no ciliary redness or photophobia. In the left eye the pupil is blocked by greyish lymph, the iris is swollen and discoloured. In the right eye there are considerable posterior synechiæ, some lymph in the pupil, discoloration, and some swelling of the iris. The irides look as if they should be blue.

Ordered a grain of grey powder in sugar every night and morning and belladonna lotion to both eyes.

Mother was requested to bring the whole family at her next visit, but has never attended since.

Case IV.—*Paralysis of the Fifth Nerve with Ulceration of the Cornea.*

Wm. H., æt. 29, a weakly, anæmic-looking man, had for some time past noticed numbness of the left side of face His general health had been fairly good; he was not recovering from any acute disease.

March 3rd, 1873. Four days ago the left eye became inflamed, but was not painful. There is a large superficial ulcer occupying the centre of the cornea and extending a considerable distance on all sides, its surface is dull and opaque, there is pus in the substance of the cornea, and in the anterior chamber the conjunctiva is red and swollen. The eyeball, and all other parts supplied by the sensory division of the fifth, are more or less numbed, there is total anæsthesia of the parts supplied by the first division, some sensation of parts supplied by second division, and considerably more of parts supplied by third division, especially in the course of the auriculo-temporal branch. There is some loss of power of muscles of mastication on the left side.

Treatment.—Eye to be bound up with lint soaked in belladonna fomentation; a mixture containing perchloride of iron ordered, and half a grain of opium every night and morning.

March 31st. Sensation somewhat increased in parts supplied by second division of fifth, quite re-established in parts supplied by third division, still some weakness of muscles of mastication; cornea perfectly anæsthetic, destruction of its tissue seems to be at a standstill; considerable hypopyon; tension of globe normal, perception of light; no sensation over any branches of first division of fifth.

Patient did not attend after this date.

Case V.—*Paralysis of Fifth and other Nerves—No Affection of Cornea.*

Elizabeth A., æt. 47. Married, no children, one miscarriage, (had syphilis?); health generally good.

Oct. 10th, 1873. Patient is a florid, healthy-looking woman. Five months ago she began to suffer from pain in the head, the left upper eyelid drooped suddenly; she began to experience some difficulty in biting hard food, and some impairment of vision of *right eye;* these symptoms have continued about the same up to present time.

On the left side there is total loss of sensation of all parts supplied by first division of the fifth, including the cornea, with numbness of parts supplied by second and third divisions; considerable weakness of muscles of mastication, paralysis of the

third with ptosis and divergent strabismus, but no dilatation of the pupil. The cornea is in a perfectly normal condition, with the exception of the anæsthesia; vision is unimpaired. There is entropion of the lower lid.

On the right side there is paralysis of the facial and sixth; the facial paralysis is well marked, and the soft palate is seen to be drawn to one side, the uvula being considerably to the left of the median line.

The ophthalmoscope shows only slight hypermetropia.

Ordered ten grains of iodide of potassium thrice daily in infusion of quassia.

Oct. 13th. Entropion of lower lid operated on; some slight pain was felt.

Nov. 1st. Wound made by operation, which continued open for some time, has healed; the entropion is not remedied. Condition of all nerves about the same.

Dec. 2nd. No improvement; admitted into a medical ward; remained till Dec. 31st, taking bichloride of mercury and iodide of potassium.

At time of discharge there was some improvement of sensation, but muscular paralysis remained about the same; the cornea still clear, the ptosis continued.

Remarks.—To account for the occurrence of destructive corneitis in cases of paralysis of the fifth nerve, two theories have been advanced:—1st. That it is dependent on irritation by foreign bodies, and constant exposure of the cornea, consequent on its anæsthetic condition not calling for the normal movements of the eyelids. 2nd. On the absence of the influence of the fifth nerve on the nutrition of the part.

The two cases given above do not appear to favour either theory, for whilst both causes were more or less in operation in each, the cornea was destroyed in one, and in the other no change took place.

In the first case there was the anæsthesia with a normal condition of the eyelids, and opportunity for the lodgment of foreign bodies and exposure; in the second the anæsthetic cornea, although covered by the drooping lid and thus pro-

tected from external influence, was subject to a source of constant and severe irritation, viz., friction by the lashes of the inverted lower lid, but its integrity was retained unimpaired during the whole time that the patient was under observation, viz., from Oct. 10th to Dec. 31st.

With regard to the first theory, the cornea of one eye being anæsthetic, does not prevent the movements of the eyelids in concert with those of the fellow eye, consequently the anæsthetic cornea has the same opportunity of cleansing itself as if it were in a normal condition; it may be argued that there is failure of the lachrymal secretion in paralysis of the fifth, but in the above cases the moisture was plentiful. Again, in cases of old glaucoma where the corneæ have both become totally anæsthetic, there must be much greater opportunity for the lodgment of foreign bodies and exposure, as neither eye feels inconvenience from either cause, but though some haziness and roughness of the cornea is met with, no form of destructive corneitis is set up, the lids closing over the eyes without stimulus quite frequently enough to keep the corneæ free from undue irritation.

It is not intended for a moment to argue that exposure and contact of foreign substances are not causes of destructive corneitis, as this form of inflammation is frequently met with in cases of ectropion, destruction of the eyelids, and occasionally in extreme exophthalmos, but merely to show that it is not alone the cause of the affection met with in paralysis of the fifth nerve.

Respecting the second theory, Case II shows that removal of nervous influence does not alone cause destructive corneitis; the anæsthesia of parts supplied by the first division of the fifth was most complete, but, as above stated, there was no corneal affection, neither was the sight impaired.

From all this it would appear that some other cause must be sought for the occurrence of so-called "neuro-paralytic ophthalmia," which is probably a combination of the two above given in conjunction with a third, which does not appear very evident, but is possibly to be found either in

some constitutional condition or in the seat* of a local lesion causing the paralysis; of these constitutional debility, from whatever cause arising, appears most likely to be the third factor required for the production of the disease under consideration.

* It has been found that destruction of the eye ensues more rapidly after division of the fifth beyond the Casserian ganglion, than when it is divided between this and the brain; the same also occurs on extirpation of the superior cervical ganglion of the sympathetic.

Part II.

A Periscope

OF

CONTEMPORARY OPHTHALMIC LITERATURE.

APPARENT ACCOMMODATION WITH APHAKIA.

Professor Donders in this paper refutes the assertion of Förster, that there is true accommodation present in cases of aphakia. He proves this by showing that the acuteness of vision does not remain the same for different distances, which he says ought to be the case if accommodation were present. To Förster's statement, that the accommodation was greater after the operation in young persons than in old, and on which Förster lays great stress, and that the accommodation increased for some time after the operation, Donders says the explanation is to be found in the greater acuteness of vision which is present in the young, and which increases for a time after the operation. He further shows that the size and form of the pupil must be taken into account, and says that what may after extraction seem a good pupil, may, on examination by the ophthalmoscope or oblique illumination, show an unclean edge, or streaks running across it dividing it into two or more pupils. Experiments were made as to the influence of the circles of diffusion on the acuteness of vision, which showed that the size of the diffusion circles, whereby the aphakial eye discriminates, does not oblige us to assume that a true accommodation is present. This was still further proved by causing a normal eye to be artificially mydriatic, when with absolute want of accommodation, an apparent accommodation was present, as great as in the cases of aphakia related by Förster. In concluding, Professor Donders denies that the changeability of the astigmatism by aphakia, which Reüss and Woinow had found, could be dependent on the form of the sclera, and thinks it may have depended upon the want of proper adjustment of the axis of the cylindrical glass to the patient's eye.—(Græfe's "Arch. f. Ophth.," Bd. xix, Abth. i, p. 56.)

STEREOSCOPY WITH DEFECTIVE VISION, ETC.

Dr. S. G. van der Meulen has given in this paper the results of numerous observations made on artificial ametrops by different methods, electric sparks in a darkened chamber, electric sparks in a dark box, momentary lighting in the stereoscope, and the fall apparatus of Hering, the last of which methods he considers most suitable for clinical purposes. Hering's apparatus, a description of which will be found in the Arch. f. Anat. Physiol. ü. Wissenchaftl. Medicin, Jahrgang, 1865, s. 153, has been somewhat improved by van der Meulen, so that care is taken that (1) the time during which the balls are in the field of vision, is sufficiently short to prevent any movement of the eyes; (2) the balls fall from such a height that, at different distances from the eye, they pass through the field of vision in the same space of time; and (3) the angle under which the balls are seen is always the same. By this improved apparatus he thinks every indication for the judging of distance by one eye is properly guarded against.

No case of strabismus which was examined, either before or after operation, possessed stereoscopic vision. In one case of relative strabismus divergens by trifling, and relative strabismus convergens by greater distances, the power of judging distance was perfect.

Having caused anisometropia, it was found that by the difference of about $\frac{1}{7}$ some mistakes were made, that by different persons greater differences were required; by some the difference of $\frac{1}{3}$, and by others even greater than $\frac{1}{2}$, to give the results obtained by monocular vision. He thinks that when by anisometropia the convergence is right, and the worst ametropic eye still receives an impression, this is always of assistance in the judging of distance.

Simple astigmatism with the ametropia in the vertical meridian did not prevent the judgment of the distance of the falling ball, while this power by astigmatism with the ametropia in the horizontal meridian was lessened by slight changes of distance.

By cases of artificial insufficiency, so long as the fixation point was seen single, the judging of the distance was perfect, whether the refracting angle was towards the outside or the inside. The judging of trifling differences of distance was indeed easier when the refracting angle was to the outside than with the naked eyes, while when the angle was to the inside, a correspondingly opposite effect was produced. If the prisms were so strong, that it was with difficulty they were overcome, and sometimes a double fixation point appeared, a trifling difficulty was felt in determining the distance, and prisms which were so strong that the fixation point no longer appeared single, completely destroyed the judging distance power.

In cases of artificially defective vision of one eye of $\frac{15}{100}$, the power was somewhat less perfect than with two normal eyes; that of $\frac{4}{200}$ decreased the power slightly; while an eye with $\frac{5}{1000}$ only, gave no more advantage to the normal eye than it possessed alone. Van der Meulen concludes from this, that where one eye is normal, and the other suffers from some opacity, by improving the acuteness of vision to $\frac{4}{200}$ by iridectomy or otherwise, the patient will have been rendered a great service by enabling him to judge of the distance of large objects.

In cases of torpor of the retina, artificially simulated by means of "London smoked glass," having previously measured by Förster's apparatus for determining the light perception, how much greater a mass of light was necessary to distinguish with these smoked glasses the same figure as the same eyes could distinguish unarmed, he found that the torpor must be very great to destroy the power of judging distance.

When stereoscopic vision without the corresponding half image was produced by means of prisms, so that half the image of a line fell upon the upper part of one, the other half upon the lower part of the other retina, so that the two half images in no stereoscopic sense could have corresponding points, a proper stereoscopic representation could be produced.—(Græfe's "Arch. f. Ophth.," Bd. xix, Abth. i, p. 101 and 137.)

STOKES' LENS AND ITS APPLICATION TO THE ANOMALIES OF REFRACTION.

Since Professor Stokes, in 1849, gave the lens to the scientific world which has since then borne his name, many attempts have been made to make it of use in determining the amount of refraction in astigmatic cases, the purpose for which Professor Stokes proposed it. Schweigger and Javal especially devoted their attentions to it, but on account of some technical difficulties, the want of having constant axes to the glasses probably being the greatest, it has not come into use in the ophthalmological cliniques.

Taking a hint from the movement of Wecker's double prism, Dr. Snellen has had made a Stokes' lens whose axes move equally from each other, and by arranging the axes to start from 45° from the vertical, the one axis becoming horizontal and the other vertical, a power is obtained from each glass, which acts according to the direction of its axis. This he proposed to use in the way that Stokes' lens had always been used, by placing a spherical lens, or a combination of spherical lenses, as in the usual Dutch telescope, before the Stokes, so as to obtain a focus by the spherical lenses, which would be at midpoint between the greatest and least refractive meridians, and then by moving the Stokes already placed in the proper axis, the concave cylindrical lens

would act on the former, and the convex on the latter, in equal degrees, and so bring the rays passing through both meridians to a point on the retina. Only in cases where the meridians were equally ametropic and of opposite ametropias, was the instrument applicable by itself, and as these cases were excessively rare, it was virtually by itself useless.

The difficulties, however, which still presented themselves were the time required to find the exact meridians of greatest and least refraction, and their degrees of refraction, and preference was everywhere given to Donders' stereopœical apparatus, or Javal's optometer. To obviate these objections to the use of the lens, Mr. Laidlaw Purves proposes to determine only one meridian at a time, or by means of the lens reducing the case to one of simple hypermetropia or myopia, and then finding its degree in the usual way. He also determines the degree of cases of simple hypermetropia or myopia by the Stokes. The method proposed is as follows. It is first determined what kind of ametropia is present by asking the patient to look towards a dark screen having two or three apertures, standing in the same line, behind which a bright light is placed. Should each aperture give a round light to him, astigmatism, except where there are equal degrees of opposite kinds of ametropia present, is negatived, and the kind of ametropia is determined by placing a piece of cardboard before one side of the pupil which shuts off the light on the same side if myopia is present, and on the other side if hypermetropia is present, or by the position of the line which the lens gives on being moved before the eye. Astigmatism not being present, it is immaterial in what position the lens is placed before the eye, and all that is required is to note at what angle the axes of the two lenses stand to each other to convert the diffusion images given by the light into the sharpest line that can be obtained. This angle gives by the usual method the amount of the ametropia. Should, however, astigmatism be present, which is known by the patient saying that the lights in the dark screen are longer in one axis than in another, the position of the meridian of greatest ametropia is determined by revolving the screen till the long axes of the different lights stand end to end, the point at which this happens being marked off by a graduated scale at the outside edge of the revolving screen. The lens is now placed in the same axis, and moved till each light becomes a sharp line, and then placing the lens axis at right angles to its former position it is moved till a sharp line is there obtained, and the two angles at which these lines are obtained will give the degrees of refraction of the two chief meridians. This method may be applied by using lines instead of points of light, or by using small apertures in a screen behind the lens. Mr. Laidlaw Purves uses a modification of the same lens as a refractoscope, and by enabling the ophthalmoscopist to determine by what power

he obtains the different meridians of the retina, not of the vessels on the disc, clearly, gives him objective information of the state of the refraction in, he believes, a speedier manner than by the use of different spherical lenses.—(Græfe's "Arch. f. Ophth.," bd. xix, Abth. i, pp. 78 and 89.)

OPERATION FOR CICATRICIAL ENTROPION AND TRICHIASIS OF THE LOWER LID.

Dr. Schneller places Jäger's horn spatula between the lid and the ball, and makes two incisions through the entire skin down to the muscle parallel to the edge of the lid, the upper from two to one and a-half millimetres removed from it, and the under from two to four millimetres lower, according as the effect is desired to be weaker or stronger. These horizontal incisions are joined at their two ends by two oblique incisions, so that the piece of skin between the incisions is entirely circumscribed by them. The skin around this circumscribed part is loosened from the subjacent tissue in all directions for about half a millimetre, so that it will be easily movable, the circumscribed portion being left intact and hurt as little as possible. The upper edge of the upper incision is now joined by sutures to the lower edge of the lower incision, bringing the two loosened edges over the circumscribed piece of skin, which is hid as by a curtain. The sutures must only be drawn sufficiently tight to bring the edges close to each other, but not to cause them to fold inwards. The length of the incisions ought to correspond to the length of the portion of lid implicated, and should extend slightly beyond it at both ends. The enclosed portion of skin acts favourably as a wedge in every direction, presses the cartilage inwards towards its proper position, shoves the lower portion of the bridge of skin upwards, and presses the upper portion with the lid edge outwards. The after treatment consists in a dressing of charpie with a bandage over it, which is removed in 24 hours, dressing the wound every 12 hours thereafter. The sutures are removed in 96 hours, and English plaster is laid on the cicatrix for one or two days, with a bandage over it.—(Græfe's "Arch. f. Ophth.," bd. xix, Abth. i, p. 250.)

TATTOOING OF THE CORNEA.

In an examination as to the most useful colours with which to tattoo the cornea, made by means of experiments on rabbits and frogs, Mr. Archer came to the conclusion that ultramarine, sienna, and Chinese ink are good; indigo and Berlin blue fairly good; but that gamboge is not in any case to be used, as it causes great irritation and a speedy desquamation of the tattoed part of the cornea. Further experiments were made by means of

ultramarine as to what befell the pigment particles in the tattooed cornea. When the pigment had been introduced some time, and after the needle punctures were closed, and the continuity of the tissues had been again restored, the ultramarine particles were found removed from the original punctures, lying singly or in groups, distributed amongst the epithelium or the fibrous tissue. The pigment granules were found within the protoplasm of the epithelial cells, but never within the epithelial nucleus. The "wandering cells" of the cornea gradually accumulated round the tattooed spot, and carried off particles of the ultramarine. On the twenty-fifth day from tattooing the blue could be seen lying amongst the fibrous tissue at the spot where the punctures were made in "sharply bounded small spaces, whose dimensions not seldom considerably surpassed those of corneal corpuscles." The total amount of pigment was lessened to the half, and solitary "wandering cells" were only found, none of which contained pigment. After this time the mass of pigment in the cornea was not noticeably diminished.—(Græfe's "Arch. f. Ophth.," bd. xx, Abth. i.)

DIVISION OF THE CILIARY NERVES ON ACCOUNT OF CONTINUED NEURALGIA IN AN AMAUROTIC EYE.

A FOIL having penetrated the orbit, causing among other affections blindness and pain, the patient thirteen years afterwards consulted Dr. Snellen on account of the excessive pain of the amaurotic eye, which was very sensitive to the slightest pressure over a sharply circumscribed spot at the upper and outer ciliary region. There were no inflammatory symptoms, and light perception was completely absent. The pupil, of the same width as the other, was drawn a little upwards, but dilated fully under atropine. Ophthalmoscopic examination showed the optic disc entirely white and the retinal vessels normal. Tension was not exalted. The other eye was emmetropic and healthy. Atropine, &c., having failed to lessen the pain, and enucleation being objected to, Dr. Snellen divided the ciliary nerves in the following manner:—The patient being under chloroform, a conjunctival incision was made along the upper border of the rectus externus from before backards, and Tenon's capsule was divided in like manner. The tendon of the muscle was then separated from the sclera, and a pair of curved scissors passed behind the globe, the arms being shut, to the optic nerve, on feeling which small snips were made down to the nerve, which were followed by bleeding from the ciliary vessels. The conjunctival wound was joined by three stitches. The sensitiveness on pressure was relieved, complete anæsthesia being found on the spot which was before so irritable.—(Græfe's "Archiv. f. Ophth.," bd. xix, Abth. i, p. 257.)

OPHTHALMOMETRY AND MICRO-OPTOMETRY.

Dr. M. Reich, of Petersburg, gives in this paper the results of some ophthalmometrical and micro-optometrical measurements by Helmholtz's and Schœler and Mandelstamm's methods. He finds, like Schœler and Mandelstamm, that the posterior surface of the lens changes its position during accommodation. The amount of movement by his measurements is less than that given by them, being from 0·0715 to 0·1529 of a millimetre. He further agrees with them in stating that the radius of curvature of the posterior surface of the lens is shortened during excessive attempts to accommodate. For fairly accurate and quick determination of the position of the plane of the pupil and of the posterior lens surface he recommends Schœler and Mandelstamm's method, while for the most perfect measurements he prefers Helmholtz's ophthalmometer.—(Græfe's "Arch. f. Ophth.," bd. xx, Abth. i, p. 207.)

THE ACTION OF MUSCARIN ON THE ACCOMMODATION AND THE PUPIL.

Drs. Krenchel and Mülder give the results of experiments made in the physiological laboratory at Utrecht on the action of must carin on the accommodation and the pupil. They fully support the assertions of Schmiedeberg and Koppe that muscarin causes a spasm of the accommodation, which shows itself as a quickly increasing myopia, and disappears in from one to two and a half hours. This spasm of the accommodation begins after the application of the muscarin to the conjunctival sac in from five to ten minutes, and reaches its maximum in from fifteen to thirty minutes. The action upon the pupil is not uniform in proportion to the accommodative spasm, the contraction being great in some and small in others. Its entrance was somewhat later than the nearing of the far point, but increased regularly, and was at its maximum when the accommodative spasm had subsided, and only disappeared in from three to twenty-four hours. He therefore thinks that these two actions are independent of each other. In further proof of this, by using atropine and muscarin together in certain proportions, he could produce spasm of the accommodation with a dilated pupil. The pupil so acted upon by muscarin Dr. Krenchel has always found to act under the influence of light, which negatives the hypothesis of a spasmodic condition of the antagonistic muscles. He found in opposition to Schmiedeberg and Koppe's statements that the relaxation of the spasm of accommodation lasted nearly double the time that the production did, and that he could not entirely abolish accommodation. In these two respects he finds muscarin and Calabar bean to agree. But the two differ in their action in that while

Calabar bean acts most easily on the pupil, and only by greater doses on the accommodation muscarin acts most easily on the refraction, and with more difficulty on the pupil; and also that while Calabar bean causes in the first place an exalted capability of action, and only by stronger doses a true spasm of the ciliary muscle, the muscarin produces first the spasm and afterwards the exalted capability. As a supplement to the above paper Dr. Krenchel gives the results of some experiments undertaken at Professor Donder's invitation to test the statements given out last year by Rossbach and Fröhlich which were in opposition to former authorities on the action of atropine and Calabar bean, but which are denied in every particular by Dr. Krenchel.—(Græfe's "Arch. f. Ophth.," bd. xx, Abth. i, p. 135.)

ON THE DEVELOPMENT OF LIVING TISSUES PLACED IN THE EYE.

Dr. Dooremaal finds that dead bodies placed in living tissues cannot grow. Pieces of cork or paper passed into the cornea or anterior chamber were sometimes extruded by perforation of the cornea and with prolapse of the iris, or were enclosed as a capsule consisting either solely of fibrous tissue or of fibrous tissue with layers of epithelium developed inside the capsule. Hairs placed in the anterior chamber did not cause much irritation, and one passed through the cornea, which remained almost free from irritable appearances. Of the living tissues introduced into the eye, a piece of cornea and a piece of periosteum were extruded, and panophthalmitis resulted in a dog into whose eye human epidermis had been introduced; but other portions introduced became true constituent parts of the eye, deriving their nourishment from them, and furnished with vessels. A portion of the skin of ear which was introduced seemed to become encapsulated the same as a dead tissue. A piece of mucous membrane from the lip developed into a tumour resembling the cholesteatom-perle or epidermidom of Rothmünd and Bühl, and the epithelioma-perlé of Moneyer, differing from them in that the cells here showed more the character of epithelial than of epidermal cells.—(Græfe's "Arch. f. Ophth.," bd. xix, Abth. i, p. 359.)

CLINICAL COMMUNICATIONS ON RETINITIS PIGMENTOSA, ETC.

In a paper entitled "Clinical Communications," Dr. Baumeister gives some observations made in the Utrecht Private Ophthalmic Clinique of Professor Donders. One case of *unilateral retinitis pigmentosa*, with deafness on the same side, occurred in a man aged 44. A case of *acute amblyopia*, with general paralysis of the muscles of the eye, in which the ophthalmoscope gave no

indications of disease or of ametropia, was restored from $\frac{3}{CC}$ to $\frac{20}{XX}$ by artificial leeching and the external application of the tincture of iodine. Two cases of *nystagmus*, in which the refraction, media, and retina seemed normal, improved their acuteness of vision in the one case from $\frac{15}{L}$ to $\frac{15}{XX}$ and in the other from $\frac{15}{L}$ to $\frac{15}{XXX}$ by an oblique position of the head, the improvement not being due to the acting of the angle of the lids on the pupil as a stenopaic apparatus, as a stenopaic apparatus did not improve the acuteness of vision when the head was kept upright.—A woman of 21 years, with *congenital amaurosis* which prevented her determining light from dark, had her pupils influenced by light, dilating in from 15 to 20 seconds from $3\frac{1}{2}$ millimeters to 5 millimeters, and contracting as slowly. There was, however, no consensual action.—(Græfe's "Arch. für Ophth.," bd. xix, Abth. ii, p. 261.)

SYPHILITIC CHOROIDITIS.

Professor Förster in a paper in "Græfe's Archives," gives the results of his clinical observations on choroiditis syphilitica. *Objective Symptoms.*—He thinks the complication of very fine dust-like opacities of the vitreous are seldom absent, and is a very early symptom. These opacities are especially found at the posterior, lower, and central portions of the vitreous humour, the upper and lateral portions being generally freer from them. This he has observed to pass into such a dense opacity that the optic disc was no longer visible, though more frequently he has had the opportunity to observe the clearing of the vitreous. It is usually very obstinate, and some remains of the opacity are left after the diseased process is passed, causing the vessels of the retina, the inner side of the optic disc, and the central portion of the retina to have a grey veiling over them, the periphery being generally free. The changes of the retinal vessels, apart from this veiling of the central ones, he thinks are trifling, and not to be relied upon. Circumscribed changes in the red colour of the retinal ground, he says, are present in at least a third of the cases, are more frequent in the region of the macula, and consist of groups of light red or white spots, and sometimes of larger light grey spots. These must be carefully looked for, as they are not always very apparent. The usually recognised pigment changes come much later. *Subjective Symptoms.*—These are important. The acuteness of vision is in mild cases lowered to $\frac{3}{4}$ or $\frac{1}{2}$, but without much objective change may go to $\frac{1}{10}$ or $\frac{1}{100}$. The pecu-

liarity of the defective vision is, that the fixation point itself is fairly seen, while there is a more or less regular ring-formed defect round it, the periphery still acting properly. The defect may run out to the periphery of the field of vision here and there, leaving the visus reticulatus, which is the result of this affection more often than of any other. In the first stage small defects of vision towards the blind spot may be seen, which do not give a bad prognosis. Hemeralopia is a highly constant symptom, which Professor Förster measures by means of his "Lichtsimmesser." The light perception he finds much more lowered than the acuteness of vision, and the light perception can undergo considerable deterioration, although the acuteness of vision is very little altered. Sometimes the hemeralopia is present only on certain parts of the field of vision. Another very constant symptom he believes to be subjective light sensations, generally in the region of the fixation point, consisting of transparent spots in the form of discs, rings, or oval figures, which move with a shaky velocity. These, if lasting, prove a defect, which may be found if carefully looked for. This photopsy passes away if the patient is kept at rest, but any excitement of the circulation is sufficient to call it up. Micropsy, as noticed by Mooren and Schweigger, is also sometimes present, depending, Förster thinks, on the retinal change, and not on the accommodative apparatus. The accommodation is lessened, and he thinks he has observed a degree of myopia developed during the course of the affection, but never any hypermetropia. Iritis is not uncommon, either before the choroiditis or succeeding it, but it does not produce lasting posterior synechiæ, does not go the length of the closure of the pupil, and has no inclination to become chronic. The choroid is thought to be the chief seat of the disease and the tissue first involved.

The course of the affection is very varied and subject to relapses, which are diagnosed by loss of acuteness of vision, a return of the hemeralopia and photopsy, before the ophthalmoscope gives any appreciable changes. The results he has obtained have been mostly favourable, with a more or less lowered acuteness of vision, sometimes a high degree of amblyopia with visus reticulatus, and rarely perfect restoration. Where the acuteness of vision is under $\frac{3}{4}$ or $\frac{1}{2}$, vitreous opacities of different forms, small or great changes in the choroidal pigment, atrophy of the retina, or white spots of round or radiating forms in the region of the macula lutea are found. The optic disc is of a homogeneous yellow white, with the vessels few and thready, giving so exactly the appearances seen in retinitis pigmentosa, that the differentiation of the two affections by the objective appearances only may be very difficult. He avers that it comes much more frequently in later life than in youth. Of 55 cases two were in their 24th year, and the remainder were over 27, 14 of them being

between 51 and 60. It occurs equally in males and females in hospital practice, both together giving a proportion of 2½ in every thousand ophthalmic cases.

The treatment he relies upon is the mercurial, with simultaneous residence in a dark room for at least four weeks. Corrosive sublimate or calomel he has seen benefit from, but relapses were frequent after the former, and always after the latter, while all those cases where no relapse occurred were those in which mercurial inunction had been employed till the beginning of mercurial stomatitis was observed, with a sojourn in a dark room, for the most of the time in bed. He thinks the use of the artificial leech, and large blisters on the neck are useful secondary means, but to be used in connection with the mercurial treatment and not to be relied upon alone.—(Græfe's "Arch. f. Ophth.," bd. xx, Abth. i, p. 33.)

ACCOMMODATION WITH APHAKIA.

Dr. Woinow describes the means he used to determine the truth of Forster's assertion that with aphakia there may be accommodation present, and comes to the conclusion that in aphakial eyes certain changes are observed, which must be considered as appearances of accommodation, but he cannot explain what the mechanism is by which these appearances are brought about.—(Græfe's "Arch. f. Ophth.," bd. xix, Abth. iii, p. 107.)

THE NODAL POINTS FOR ECCENTRIC RAYS.

Drs. Landolt and Nuel relate the experiments which they made on rabbits by means of the ophthalmometer to determine the nodal points of rays passing eccentrically into the eye. They found that the nodal point for peripheral rays lies from 1·07 to 1·09 nearer to the retina than that for axial rays, and, that the former lies somewhat, though very slightly, in front of the latter. The more peripheral the image is, the smaller it is, but this reduction of the image is more trifling than the reduction of the acuteness of vision towards the periphery, and the latter is not explained by the former. They think this loss depends on defective light, the lessened number of ganglionic cells in the periphery, and the limited use which is made of this portion of the retina.—(Græfe's "Arch. f. Ophth.," bd. xix, Abth. iii, p. 301.)

DOUBLE PARALYSIS OF THE THIRD NERVE.

In the Journal of Mental Science, July, 1874, Dr. Hughlings Jackson records a case of syphilitic brain disease, in which the earliest symptom was paralysis of both third nerves. According to the patient's account these palsies came on suddenly. The patient

had other nervous symptoms not of special ophthalmological interest. At the autopsy there was found extensive gummatous disease of the cerebral arteries. "Both posterior cerebral arteries and both superior cerebellar arteries, and the two third nerves, were all fixed to one another by material similar to that thickening the arteries."

DOUBLE OPTIC NEURITIS FROM SYPHILITIC BRAIN DISEASE.

In the same paper he records the case of a patient who had double optic neuritis, and afterwards other nervous symptoms, from intracranial syphilis. There was paralysis of the left third nerve. There was also the symptom lateral deviation of the two eyes; they turned to the left. The case is too long for abstract; the above note shows that it will repay reference.

The following quotation is from the remarks preceding the case. Dr. Hughlings Jackson thinks that few medical men, excepting ophthalmologists, believe that a patient with severe neuritis, can read the smallest type. He therefore keeps urging the truth of that statement:—

"I would here remark that, as this case illustrates, double optic neuritis frequently exists when there is no evidence to show that sight is affected, and indeed when there is clear evidence that it is good.

"I have asserted this over and over again, but it is a thing hard to believe. Besides other reasons, the importance of recognising this is that we shall often discover optic neuritis too late for successful treatment—too late, I mean, for the *prevention* of amaurosis—unless we examine the eyes by routine. If a patient has any kind of nervous symptoms, especially pain in the head, we must not wait until his sight begins to fail; we should use the ophthalmoscope by routine. If we do we shall discover optic neuritis in its pre-amaurotic* stage.

"Another thing to be mentioned is that optic neuritis from syphilitic disease in the brain differs in no way from optic neuritis the result of a glioma or other 'foreign body.' Optic neuritis tells us nothing more than that there is coarse organic disease of some kind within the cranium. Its diagnostic value is the same whether sight be affected or not. There is no difference in the optic neuritis, whether the tumour or other foreign body causing it be in the cerebrum or cerebellum. It is

* In the next (the fourth) volume of Crichton Browne's West Riding Asylum Reports, Dr. Hughlings Jackson will publish two chromolithographs of the fundus oculi, by Burgess. One of them shows acute and extreme neuritis in a patient who could read the smallest type; the other shows the optic nerve and fundus after recovery from the neuritis. The changes left by the neuritis are insignificant. The patient did not recover from amaurosis; he had no defect of sight to recover from. (See on "Recovery from Neuritis," p. 518 of the last number of this Journal.)

of no value whatever in localising beyond that it points to disease within the cranium."

OPHTHALMOSCOPICAL EXAMINATION DURING AN ATTACK OF EPILEPTIFORM AMAUROSIS.

Dr. Hughlings Jackson communicates the following to the *Lancet*, February 17, 1874:—

"This patient had attacks of what I used about ten years ago to call epilepsy of the retina, but which I have for some time called epileptiform amaurosis. It is the most striking case of the kind I have seen. The most common clinical association of paroxysmal defects of sight is convulsion beginning unilaterally, as I have long noticed. There was no such association in this case. The phenomena are sometimes positive, *e.g.*, colours, sparks, &c.; in other cases, as in the following case, negative. Another peculiarity of this case is that there was neuritis, and that too with considerable impairment of sight.

"Henry G——, aged thirty-four, was an in-patient under my care June 27th, 1870, for symptoms which I believed to depend on intra-cranial tumour, certainly on severe encephalic disease. Very careful notes were taken of his case by my colleague, Dr. Gowers, but I extract from them only so much as bears on one point—namely, paroxysmal loss of sight. I first give what my colleague gathered from the patient as to this phenomenon.

"'June 16th.—During the last two or three days he has had occasional attacks of loss of sight coming on gradually and lasting several minutes—he says, five or ten; there is not complete darkness, but a degree sufficient to prevent him from distinguishing any object. Headache, frontal, and aching in the limbs accompany the attacks; the headache continues afterwards.'"

"It is to be noted that at this time he could read No. $1\frac{1}{2}$ Snellen with each eye. There was, however, double optic neuritis. I have for years insisted on the fact that sight may be good when the optic discs are very bad. He continued subject to the above described paroxysms, and by July 1st his sight had failed so that he could at no time read No. 20 of Snellen. Now comes the part to which I wish particularly to draw attention. Mr. Burgess had made me a drawing of the fundus of one of the patient's eyes, and I went to the hospital to compare it with the "specimen" itself. The following is an account of what took place:—

"July 4th.—This morning, when I was speaking to him, he said nervously, 'The blindness is coming on.' We put him in a chair; he said *he could see nothing*. To test this I put my fingers before his eyes, jobbing them forwards, as if I would put them into his eyes; this produced no effect until I touched the

lashes. In about half a minute he said he could see a 'light object,' but further improvement was slow and the blindness returned. I took him, in this second attack, to the gas-lamp; he 'thought he saw a light' when I threw the light into his eye for ophthalmoscopic examination. I discovered no change of importance. As just before I had been comparing his left disc with Burgess's drawing, a notable difference could not have escaped me. The large veins in the left eye were, perhaps, darker than before the paroxysm, an observation of no definiteness. It was curious to note the difference in his 'ocular manner' from that during a former examination. From habit, I kept saying, 'Look at my little finger;' and now, he being temporarily blind, no result followed. After writing down the latter part of the above I returned to him. He then said he could see objects, and he counted my fingers and followed quickly and very correctly the movements of my hand—that is, he directed his eye to the finger I asked him to look at. At that examination, *i.e.*, after the second paroxysm instanced, I felt sure that the veins (I speak only of the left) were not as before the first attack; they were not so dark, and seemed as if slightly collapsed, being, to use an exaggerated expression, beaded. A few minutes later he could puzzle out No. 20 of Snellen.

"Under treatment by large doses of the iodide of potassium he improved, and on August 1st left the hospital feeling quite well. He could read No. 1. However, he soon got worse again, and had a severe illness, with palsies of ocular nerves, &c. He recovered from these symptoms too, except that he remained blind. He is still suffering, having occasionally pain in the head; but his general health is good."

COLOURED VISION AS AN "AURA" IN EPILEPSY.

In the Hospital Reports of the "British Medical Journal," February 7, 1874, are remarks by Dr. Hughlings Jackson on this subject.

It is said that, in cases of colour-blindness from disease, red is, in most cases, the first colour to go; and that the further progress in loss of colour-sight is towards the violet end of the spectrum. [In the great majority of cases of congenital colour-blindness, red is the fundamental colour not seen. All people are red-blind in the most peripheral parts of the retina, and more extensively so to its nasal side.] Loss of power to see colours is one of the sensory analogues of palsy of muscles (motor nerves). Now, just as palsies have their mobile opposite in spasm, so, in opposition to loss of colour-sight, there are cases of development of coloured vision. [Of course the physiological comparison is, strictly speaking, betwixt excitations in motor and sensory nerves.] Thus, occasionally, a patient who is subject to epi-

leptic or epileptiform seizures, may have, as a first symptom (so-called aura), a colour, or "all manner of colours," before his eyes. It is well, when the patient is intelligent, to ask which colour is first developed, and the order in which they come. Theoretically, one would expect that the first colour to be developed would be red, because it is the one first lost in cases of colour-blindness. For, returning to paralytic symptoms for an analogy, we find that those very movements which are first lost in destruction of nervous organs, are those which are first developed in epileptic discharges of nervous organs. Dr. Hughlings Jackson thinks, so far as limited and recent inquiries enabled him to judge, that red is usually the colour first developed when colour-development is a "warning" of an epileptic seizure. It is not always so; one of his patients has blue vision before severe epileptic fits; and she has had attacks of the blue* vision, followed by temporary and complete darkness, without anything further. To ask patients to note the order of development of colours would, however, avail little in the majority of cases; probably there is, in most cases, a development of colour, rapidly becoming complex ("rainbow"). The order of frequency in which the higher senses suffer in epilepsies is, Dr. Hughlings Jackson believes, sight, smell, hearing. An aura of taste, is very rare; a "sting," or other non-gustatory aura, from the tongue, is not so uncommon. It is not easy to say where touch comes.

NOTE ON THE DIAGNOSTIC VALUE OF PARALYSIS OF THE THIRD NERVE WITH HEMIPLEGIA.

Dr. Hughlings Jackson contributes the following to the Hospital Reports of the *Lancet*, September 6, 1873, under the heading London Hospital:—

"It is well known that a lesion of the crus cerebri can produce paralysis of the third nerve on the same side as the lesion, and of the face, arm, and leg on the other side. But it would be a great mistake to suppose that when we find paralysis of the third nerve on one side, and of the face, arm, and leg on the other, there is necessarily disease of the crus cerebri. In a case [at the London Hospital] manifestly of intracranial syphilis, there was the association of symptoms mentioned; but it was pointed out that, *as the ocular palsy came on at a different time from the hemiplegia*, there were no doubt *two* lesions—syphilitic disease of the right third nerve (a neuroma), and disease of the right side of the brain. At the autopsy the two lesions were found.

* Blue, according to Maxwell, is the fundamental colour most removed from red. Helmholtz adopts the theory of Thomas Young, that the three fundamental colours are red, green, and violet.

"If the third nerve be paralysed on the *same* side as the face, arm, and leg, there are of course two lesions—one of the trunk of the nerve, and the other of the motor tract on the opposite side."

Dr. Hughlings Jackson has recorded a case in which there was paralysis of the right third nerve and hemiplegia of the left side, in this Journal, vol. iv, p. 442. In that case there were two lesions, one at the base and one of the right cerebral hemisphere.

LATERAL DEVIATION OF THE TWO EYES FROM DISEASE OF THE BRAIN.

In an article* in Crichton Browne's West Riding Asylum Reports, vol. iii, Dr. Hughlings Jackson speaks of certain ocular symptoms which are not likely to come often under the notice of the ophthalmic surgeon.

"In some cases of hemiplegia there occurs a symptom which shows that there are in the brain, at any rate in the corpus striatum and adjoining convolutions, nervous processes for highly special† movements of the two eyes. . . . . The symptoms are, turning of the two eyes *from* the side paralysed in hemi-*plegia*, and, correspondingly, turning of the two eyes *to* the side convulsed in cases of hemi-*spasm*. This lateral deviation of the eyes was first described by Vulpian and Prévost.‡ . . . . .

* "Observations on the Localisation of Movements in the Cerebral Hemispheres, as revealed by cases of Convulsion, Chorea, and 'Aphasia.'"

† The following remarks from an article (on the Anatomical Investigation of Epilepsy and Epileptiform Convulsions) "British Med. Journal," May 10, 1873, may be given as showing the nature of this ocular symptom:—

"Before we pass to speak of convulsion in man, it is necessary to state certain principles as to the constitution of nervous centres.

"The nervous centres represent movements, not muscles; chords, not notes. This is evident from the effects of destroying lesions of the corpus striatum. From a *small lesion* of this body there does not result paralysis of *a small part* of the arm, nor of any such group of muscles as flexors, or extensors; there results *partial paralysis of the whole arm*, the most special parts of it suffering most. There is loss of a certain *number of movements* of the limb. Let us take a more striking example: in cases of *very grave* lesion of the corpus striatum (that is, of a centre far above the supposed deep origins of the ocular motor-nerves), there is, besides palsy of the face, arm, and leg, an ocular palsy Now this palsy is not of the sixth nerve, nor of the third nerve, nor of the fourth, nor of any one muscle, nor of any random grouping of muscles. It is a *loss* of a highly special and widely associated movement; the patient has lost power *to look* to that side on which his body is paralysed; there is what is commonly called lateral deviation of the eyes. Similarly, in convulsion there is a *development of movements*. In a convulsion beginning in the hand, the spasm creeps up the whole limb, developing first the movements of the most special parts of it, but not picking out such groups of muscles as flexors or extensors. Among other movements, there is at a certain stage a *development* of that of the eyes for "looking" to one side. In this case the two eyes are *turned to* the side of the body convulsed."

‡ In this country by Humphry, Lockhart Clark, Hutchinson, Broadbent, Russell Reynolds, and by myself in the "Lond. Hosp. Rep.," vol. iv, 1868, &c.

"The occurrence of this symptom from disease of the brain is of very great importance for mental physiology;* *movements*† *of the eyes enter into the anatomical substrata of our visual 'ideas.'* The significance of the occurrence of this symptom (in severe lesions and strong discharges) along with affection of our chief tactual organs, is very great. Donders supposes, with Hering, that there are movements of the eyes together for *direction* (upwards, downwards, inwards, and outwards), and also of adduction and abduction for *distance.* He shows from Adamük's‡ experiments that 'au moins chez le chien et chez le chat, les deux yeux ont une innervation commune, qui part des tubercules antérieurs des corps quadrijumeaux. L'éminence droite régit les mouvements des deux yeux vers le côté gauche, et vice versâ. En irritant des points différents de chaque éminence, on peut provoquer le mouvement dans une direction quelconque, mais toujours les deux yeux se meuvent simultanément et en conservant entre eux une relation déterminée.' But such movements are also represented in the corpus striatum and adjacent convolutions (perhaps I should say, re-represented), *and in direct relation with movements of our chief tactual organ.* The movement is lost in hemiplegia, and is developed at a certain stage in convulsion beginning unilaterally. I was long puzzled by the fact that in the lateral deviation of the eyes in hemiplegia and in convulsions beginning unilaterally the eyes were parallel. As the act of accommodation (in which the eyeballs are converged) is a very important one, I expected to find the movement of convergence the *first* of the ocular movements to suffer. For, as I shall mention more particularly in my next article, the most special movements suffer first in cases of cerebral lesions. (See 'West Riding Lunatic Asylum Medical Reports,' vol. iii, pp. 315—16.) But I now see that convergence,§ as it has to do

* I am surprised that Vulpian's important statements on this ocular symptom have received so little attention in this country. Lateral deviation of the two eyes is valuable clinically as evidence of a gross lesion in cases of apoplexy; enabling us sometimes to tell cerebral hæmorrhage from drunkenness (Prévost). I have found it a most important help towards completing the parallel betwixt hemiplegia and hemi-spasm (see "Lancet," February, 16, 1867). Thirdly, as suggested in the text, the symptom is one of extreme importance for mental physiology.

† See Spencer's "Psychology," second edit., vol. i, chap. xiii.

‡ I take these extracts from a translation of a paper by Donders in "Robin's Journal," September and October, 1872. In a very brief statement in the "Lancet" (February 15, 1873), of what is given at more length above, I represented Donders as speaking only of the *lateral* movements of the eyes.

§ The following is a quotation from Dr. Hughlings Jackson's paper on "Localisation of Movements in the Brain." "Lancet," February 15, 1873:—

"There are other conjugate deviations of the eyes besides lateral. Thus in lesions of the right middle peduncle of the cerebellum the right eye is turned upwards and outwards, the left downwards and inwards. Just as there is an association of lateral movements of the eyes with movements of our tactual

with distances, belongs to the locomotor series (cerebellum) and not to the tactual series (cerebrum). The movements for carrying the retinæ over objects, are just as special in the cerebral series as those for convergence are in the cerebellar series. I say "cerebellar series," because my inference has been that the movements of convergence are chiefly represented along with movements of our spine, arms, and legs for locomotion. At any rate, according to Donders and Adamük, the two kinds of ocular movements (the parallel and the converging) are *differently* represented in different parts of the corpora quadrigemina. I continue the quotation, 'Par l'irritation de la partie postérieure, soit de l'éminence droite, soit de l'éminence gauche, on obtient une forte convergence, avec abaissement simultané des lignes visuelles et rétrécissement de la pupille.' In the corpora quadrigemina we should not expect any very great differentiation of the two classes of movements, any more than of movements for articulation and deglutition in the medulla oblongata. But betwixt the mode of representation of movements in the cerebrum and in the cerebellum, we should expect the differentiation to be carried to its extreme."*

In healthy looking at near objects, of course, both classes of ocular movements will be developed. The eyes must be adjusted; when "fixed together" so as to "reach" the object, they can be carried over the object; the retinæ can then "feel" it.

CORRELATIONS OF MOVEMENTS OF THE EYE AND HAND AS SHOWN BY CERTAIN CASES OF HEMIPLEGIA AND CONVULSION.

The following is from a lecture by Dr. Hughlings Jackson ("Brit. Med. Journal," July 18 and 25, 1874) on Hemiplegia. The extract is given, as it shows the relation of the lateral movements of the eyes to other movements, especially those of the arm and hand. It thus shows what is meant by the expression in the last note, "in direct relation with movements of our tactual organs."

It must be premised that Dr. Hughlings Jackson makes three degrees of hemiplegia from disease of the corpus striatum, or rather three degrees of symptoms from lesions of three degrees

organs for ideas of objects, so we may suppose that there will be associations of ocular movements of convergence and divergence (the former especially downwards, the latter especially upwards) with those movements of the spine, legs, and arms in locomotion, represented in the cerebellum, for ideas of distance; hence the importance of studying particular ocular deviations in association with accompanying disorder of movement." This agrees with the conclusions of Ferrier on the functions of the Cerebellum.

* It does not follow that movements represented in a lower centre, are not also represented in the higher centre. Are we to believe that the movements by which a headless frog rubs vinegar off its back, are not also represented, and that more specially in the detached head?

of gravity of this part. The distinction of course is arbitrary. In the first degree there is paralysis of the face, tongue (or rather weakness of these parts), and of the arm and leg. This was the degree of paralysis in the patient whose case was the text of the lecture. It is with the second degree of hemiplegia that we are concerned:

"*Second Degree of Hemiplegia.*

"We now pass to that hemiplegia of greater range, which I shall call the second degree of hemiplegia, or, as I sometimes say, complete hemiplegia. Our patient's hemiplegia was as complete in range as we usually see hemiplegia. His face, tongue, arm, and leg, were paralysed on one side. But, from a graver lesion than that our patient had, there is a *compound effect;* there is not only (1) *increase* in the paralysis of the face, arm, and leg, but also (2) *spreading* of palsy to more automatic parts. Thus the shoulder and trunk muscles are involved. There are also certain other prominent and very interesting symptoms which show extension of paralysis to movements of more automatic parts. These are (*a*) deviation of the two eyes, and (*b*) of the head—in both cases, from the side of the body paralysed. The following is a list of the chief symptoms in complete hemiplegia of the right side (those additional to symptoms in the first degree of hemiplegia being in italics).

"1. *The head turns to the left.*

"2. *Both eyes turn to the left.*

"3. *The muscles of the chest and belly are weakened on the right.*

"4. *The muscles passing from the trunk to the right limbs are paralysed.*

"5. The face is paralysed on the right side.

"6. The tongue, on protrusion, turns to the right.

"7. The right leg is paralysed.

"8. The right arm is paralysed."

Dr. Hughlings Jackson does not hold that the lateral only of the parallel movements of the eyeballs are represented in the region of the corpus striatum. The lateral parallel movements are the most special of the parallel movements; and they therefore suffer first and most in hemiplegia and hemi-spasm. This accords with a widely-bearing principle, referred to in the next extract. Stated generally, that principle is—

"*From lesions of the Cerebral nervous centres, parts suffer the more as they are voluntary or special, and the less as they are automatic or general.* Recovery follows the reverse order: the more automatic parts recover first." (This statement, however, is not made of the cerebellum.)

We may conclude this note with a quotation from Dr. Hugh-

lings Jackson's paper on "Localisation of Movements in the Brain," *Lancet*, Feb. 15, 1873.

"Both in hemiplegia and in convulsions beginning unilaterally we note certain associations, *e.g.*, affection of the orbicularis palpebrarum along with affection of the limbs. Donder's researches give an explanation of this association. The most important, however, is the association of affection of *certain* movements of the eyes with affection of those of our limbs. Significantly (and in accordance with the principle spoken of throughout this paper) the movements of the eyeball which are first affected are the *lateral*. We can overcome a prism of from 20° to 30° with its base placed outwards, and one of 6° to 8° with its base placed inwards; but few persons can overcome more than a prism of 1° or 2° with its base turned upwards or downwards. There is then greater variety or independence in the lateral movements of the eye. (The internal rectus is the strongest of the ocular muscles). In association with this greater independence of the lateral movements we may note that the sensibility of the retina diminishes less rapidly outwards than upwards and downwards.

"That the movements of our chief tactual organs should have close and direct associations in the *highest* nervous centres with certain movements of the eyes is what one would expect if, as Spencer says ('Psychology,' Part 24, p. 358), 'tactual impressions are those into which all other impressions have to be translated before their meanings can be known.' I suppose visual impressions and ocular movements may be said to 'stand for' tactual impressions and movements in the sense that the strong excitation of the nervous processes of the former leads to *faint* excitation of those of the latter (movements of the hands, &c.). The study of cases of hemiplegia and convulsion shows us, not only that there is an association, but the *order* in which eye movements and limb movements are associated. Of course a coarse lesion of a nervous centre, or a sudden discharge of one, is not a very neat experiment. In hemiplegia the parts suffer in degree, I believe, in the following order: arm, leg, side of face and tongue, orbicularis palpebrarum, lateral movements of eyes, lateral movements of head. The difficulty obviously is that several systems are damaged all at a blow—the movements of lifting, by which we have ideas of weight, the eye to hand movements of writing, the movements of speech, &c."

LATERAL DEVIATION OF THE EYES, OCCURRING WITH OTHER SYMPTOMS IN A CASE OF LIMITED CONVULSIONS FROM DISEASE OF THE BRAIN.

As remarked in a previous note there occurs deviation of the eyes in cases of convulsive seizures caused by disease of the brain.

The following is an example, and although recorded some time ago, is worth re-publication now that the researches of Hitzig and Ferrier are attracting so much attention. Dr. Hughlings Jackson says of it in his remarks following the report, "Medical Times and Gazette," January 29, 1872:—

"In this case the lesion was not sufficiently local to enable one to conclude that fits beginning in the face show damage to any particular convolutional region. For instance, the fits may have been owing either to discharge of the grey matter of the convolutions of the temporo-sphenoidal lobe, or of the island of Reil. In most cases of convulsion beginning unilaterally the cerebral lesion is very extensive. I shall shortly, however, report a case of convulsion beginning in the left thumb, in which there was a tubercular tumour the size of a hazel nut, in the hinder part of *one* convolution—the third right frontal convolution. By numerous observations of this kind we may confidently expect to arrive at clearer notions on localisation of movements."

The case itself is reported in the "Medical Times and Gazette," January 6, 1872. It is as follows:—

"December 7, 1871, 5.30 p.m.—I saw a patient, 41 years of age, who had been admitted under the care of Mr. Hutchinson for phosphorus-necrosis of the left upper jaw, and who had very frequent attacks of spasm, affecting chiefly the left side of the face. I saw six attacks in about half an hour. The description of what was observed in the third (apparently the severest) is as follows:—There was drawing of the mouth to the left almost horizontally; the spasm gradually spread over the left side of the face, and even to both sides of the forehead. After the face was well in action, both eyes turned far to the left, and the head turned a little, but very decidedly, to the same side. Later still both eyelids blinked (shutting and opening), but the left much the more, *i.e.*, they closed more completely, but whether more frequently was not noted. The mouth was closed throughout the attack, and respiratory efforts—for a time at least—were suspended. At one time, early in the fit, a slight snapping sound was heard, believed to indicate occasional action of the masseter and temporal muscles. When towards the end of the fit, the arm was felt (by taking gentle hold of the upper arm and forearm), there was the very faintest movement of the limb—apparently of the limb as a whole.

"After this and after subsequent attacks there was no affection of speech proper, *i.e.*, of speech in the sense of 'propositionising,' nor was there any considerable defect of speech in the sense of talking; there was only the slightest muffling of articulation. This muffling no doubt depended on paralysis of the face, for the face was paralysed on the left in the intervals of the fits. It was much drawn to the right, and when he spoke the cheek 'bagged'

on the left. He could not close the left eye nearly so firmly as the right, and when the lids of the right eye were separated, in order to use the ophthalmoscope, there was very great resistance, but none, or scarcely any, on the left side. In the attacks the patient did not speak, for his mouth was closed, and he was no doubt unconscious, although we fancied that in one attack he nodded to his wife, who called him by name.

"The above does not pretend to be a full account of what took place in the seizure. The observation was begun after the very beginning of the attack. It is impossible to observe all the details of the very complex march of a fit affecting even so small a part as one side of the face. In another attack, whilst I observed the left arm (which in this attack did not suffer at all) and the face, Mr. Haydon kept one of his hands on the chest, and the other on the abdomen. He reported that at first there was action of the abdomen (diaphragm) at shorter intervals; the chest stopped moving two inspirations before the abdomen. This—the stoppage of both—we may suppose was the climax; then (to continue Mr. Haydon's observations) there were little jerks, a sigh, and lastly deep inspirations, in which both chest and abdomen shared.

"In this attack I observed, further, that the two eyes were well turned to the left before the eyelids were closed—the eyelids were indeed at that time very widely open—and that later the eyelids rapidly opened and closed, the left eye closing very much, the right eye not closing completely or strongly, at all events. It was not noted whether the left eye closed oftener than the right.

"In still another attack the fit was noticed from the very beginning. It was then seen that there was, at the *very* first, confused movement (so to speak) of the mouth, as if the orbicularis oris *all round* was in action—not the left half of this muscle only. There were slight, perhaps doubtful, movements of the lower jaw up and down. Distinctly after the "mouthing," the horizontal drawing of the face to the left began, and the face part of the fit occurred as before.

"In one attack the left arm was raised from the body—rather, it was observed raised—and there was seen the very slightest movements of the fingers *backwards*.

"The spasm was clonic. It cannot be affirmed that there was no transient tonic spasm before the clonic spasm began; probably there was. The movements were supposed to be at more rapid intervals the later the fit, so far as the horizontal drawing was concerned. There is, however, very great difficulty in observing this point; the wider the movement the more obvious it is.

"9.30 p.m.—I saw him again with the House-Surgeon, Mr. R. W. Parker. I saw one fit, and in it the fingers of the left hand were slightly moved; the hand itself was thrown back in

slight jerks. The face as before. He had, it was said, not had one fit since I left him, but little had been seen of him. Faradisation was tried, but it could not be tried fairly, as he cried out, and there was no justification for disturbing him. The left side did act, at least equally, if not slightly more than the right. The cheek near the angle of the mouth was faradised. He had one very trifling fit; there was only a little "mouthing," preceded by a deliberate up-and-down movement of the lower jaw. He died on the 9th.

"*Autopsy*.—On cutting the dura mater on the right* side, there was a spirt of dirty thin pus, and when this membrane was cut round in the usual way so much of the right hemisphere as was then exposed was seen to be covered with pus, which lay above the arachnoid. On gently raising the brain a vein was seen passing from the right lateral sinus to a patch to be presently spoken of over the lower wall of the Sylvian fissure. The vein was like a white, tough cord. When cut into it exuded, not blood, but a thin, creamy fluid.

"The pia mater and arachnoid were thickened and infiltrated with lymph for about two square inches (but the limits were very ill-defined) over the upper and outer parts of the parietal and anterior lobes. On removing the brain no abnormality was seen on the under surface of the posterior lobes, and none on the part of the brain which lay over the lateral sinus. There was a little pus over the optic nerves, also under the right anterior lobe and over the fissure betwixt it and the left lobe; but the membranes were not thickened. The pus lay above the arachnoid. The chief disease of the brain-substance itself was at the patch above spoken of. Here the membranes were thickened and adherent to the convolutions; not firmly adherent, but the convolutions were so soft that they tore when the membranes were removed. It was supposed at first that the large quantity of pus was the result of rupture of a cerebral abscess; but, although the convolutions of the lower wall of the Sylvian fissure (about opposite the lower end of the fissure of Rolando)—that is, the convolutions subjacent to the patch—were softened into a dirty mixture of brain and pus, no abscess was discovered—that is, no walled abscess—rupture of which could have caused a large "effusion of pus." At this point the overlying veins were turned into thick, dark cords—cylinders of coagulated blood—and one vein, with thin, creamy contents, passed, as aforesaid, to the right lateral sinus. The extreme damage was very limited. There was purulent softening of about a cubic inch of the lower boundary of the Sylvian fissure, and very little extension deeply in the fissure. In the convolutions near to the part most affected were, however, many red specks (red softening). The hinder

* Erroneously printed "left" in the original.

part of the island of Reil was affected; it was affected as the convolution under the patch, for about the size of two peas, but doubtfully by direct continuity. The convolutions of the anterior, posterior, and temporal lobes all round the principal lesion were slightly softened, and of a slightly greenish hue, such as is seen in decomposing brain. The corpus striatum and the optic thalamus, crura cerebri, pons, and cerebellum were normal.

"The convolutions of the left—the comparatively sound hemisphere—were flattened and pressed together. The arachnoid surface was greasy-looking, and through it was seen a little—but very little—dirty serous fluid in the angles of the convolutions. The substance of this hemisphere was normal.

"The superior longitudinal sinus contained pus mixed with blood, and a soft yellowish-looking clot. In the right lateral sinus were chiefly flakes of purulent matter, and a soft yellowish clot. The right cavernous sinus seemed to contain nothing but pus. The left cavernous sinus was normal. Mr. Parker removed the left (*sic*) superior maxillary bone, and saw that the bone was extensively necrosed. The disease had extended to the body of the sphenoid. The dura mater over it was raised, and on removing it the bone was seen to be dark and slightly rough. All the organs in the chest and belly were normal, except the lungs and spleen. The lungs contained numerous infarctions. They were nearly all in the "apoplectic" stage, and one or two were (on section) large, raised, and quite like those more commonly seen in cases of heart disease. In the centre of two or three of the smaller ones only was there any purulent matter, and this was but slight in amount. The spleen was large and soft."

ON HEMIOPIA IN CASES OF HEMIANÆSTHESIA AND HEMIPLEGIA.

THE following remarks were made by Dr. Hughlings Jackson, after the reading of a case of hemiopia by Mr. J. Hogg, at the Medical Society of London:—

Dr. Hughlings Jackson thought the case narrated by Mr. Hogg an interesting one. In that case there must have been two lesions, one for the hemiplegia, and another for the hemiopia. Dr. Hughlings Jackson had seen several cases in which hemiopia had come on at the same time as hemiplegia, and here there was probably but one lesion. The hemiopia was such that the patient could not see to his paralysed side; the disease causing these two intelligibly associated symptoms would be of the side of the brain opposite the side of the body paralysed. A tailor* now under his observation has left hemiopia (field) and

* This case is reported in the "Lancet" for August, 29, 1874.

left hemiplegia; there is in this case comparatively little affection of motion, but significantly there is very great defect of sensation; there is indeed defective sensation of the left half of the body. One day he burnt his left hand with the "nose" of his tailoring iron; he burnt it severely, because, being unable to see to his left, and his left hand being insensitive, he had no knowledge of his mistake. Cases of this sort are the sensory analogues of cases of hemiplegia in which there is lateral deviation of the two eyes; in the former there is loss of power to *see* to the side paralysed, and in the latter loss of power to *look* to the side affected. In the latter, however, the lateral deviation of the eyes is a temporary symptom; yet it may be that there is not unfrequently a temporary hemiopia with hemiplegia. Right (field) hemiopia is more troublesome than left, as we read and write from left to right. Dr. Hughlings Jackson has discovered a right hemiopia in several cases of affection of speech (partial aphasia); it then, by a quasi-mechanical difficulty, adds to the mental difficulty the patient has in writing. The cases of hemiopia with hemiplegia appear to Dr. Hughlings Jackson to be the permanent analogues of certain cases of migraine described by Anstie, Latham, and Liveing. In some of these cases there is temporary hemiopia with temporary defect of speech, and temporary defect of sensation in the limbs. In no case of hemiopia has Dr. Hughlings Jackson seen any morbid ophthalmoscopical appearances; he has, however, had no opportunity of examining a case of temporary hemiopia. In one case of hemiopia complete blindness occurred, and then the signs of simple atrophy appeared.—"Medical Press and Circular," March 4, 1874, p. 177.

EMBOLISM OF THE CENTRAL ARTERY OF THE RETINA.

Dr. J. Samelsohn, of Cologne, writes at length on this subject. A woman, aged 62, came under his care complaining that fourteen days previously she woke up one morning unable to see with her left eye, though she could see well when she went to bed. She felt as though the eye were shut, and asked her husband to look at it. She could not even tell light from darkness. The right eye was normal, but she said she saw objects smaller than usual. In the left eye there was some perception of light upwards and inwards. The tension of the globe was increased, the retinal vessels were threadlike, there was no cloudiness, the veins were narrowed on the disc and enlarged towards the periphery. One artery passing upwards and outwards showed a spindle-shaped swelling. The macula lutea showed a bloody tinge, but was not at all hazy. The strongest pressure on the eyeball excited no pulsation, but gave rise to phosphenes. There was no affection of the heart. The arteries were atheromatous. In discussing

the question of treatment, it is pointed out that the slight but uniform fulness of the vessels gave good reason for believing that the collateral circulation proceeded from the ciliary vascular plexus, and indicated an attempt to stimulate this, which was sufficient to prevent destruction of the retina, but not to carry on its function. The increased tension present suggested that the collateral circulation might be interfered with, and that an iridectomy might lead to a greater afflux of blood. In the eye, the greater or less rigidity of the sclero-corneal capsule, the tension of which is maintained by the vitreous, offers a very appreciable resistance to the establishment of a collateral current. The amount of blood in the retinal vessels undoubtedly adds to the amount of the intraocular pressure, but the choroid and ciliary body are the real source of the fluids that create the intraocular pressure. When an embolism of the central vessel occurs, at first the tension decreases, but this diminution is neutralised by the elastic contraction of the envelope of the globe. The blood soon also passes along the lateral (ciliary) branches of the artery with increased rapidity, the process of filtration is thus hastened, and the intraocular pressure increased. This temporary increase hinders the quick completion of the collateral circulation in the region of the optic disc, and the blood hence rushes with constantly growing rapidity into the posterior ciliary arteries. The tension is more increased and the supply to the disc shut off. The operation was performed, and the vessels became decidedly fuller. The patient became able to count fingers. The improvement did not continue to progress, but remained stationary while she was under observation (three months). In reviewing other cases recorded, the author remarks that the varying amount of opacity of retina, &c., noted, depends on whether the artery occluded be a terminal one or not, that is, whether behind the coagulum, between it and the dependent capillary tract, there is given off an arterial branch that directly inosculates with any other artery, or whether such an anastomosis is wanting. If the latter be the case, that is, if the artery be a terminal one, its embolic occlusion, according to Cohnheim, may give rise first to necrosis, the natural consequence of the cessation of the circulation in an animal organ; secondly to engorgement due to the reversed action of the current of the neighbouring vein, a current impeded in the retina by no venous valves. The combination of both chains of deranged symptoms is the infarctus. Authorities differ as to whether the central artery is terminal or not; at any rate its branches are terminal. In proportion to the readiness with which a collateral circulation can be established will the retina recover its transparency, or not become opaque at all. In two cases recorded in which the arteries were said to be decidedly fuller at their peripheric distribution than at the centre, it might seem that the diagnosis of embolism was excluded, but they were clearly cases

in which the occluded artery had become replenished by means of an arterial anastomosis from the ciliary plexus of the optic nerve. It is remarked that the greater fulness of the very small arteries began immediately beyond their passage over the edge of the optic disc, that is, at the point where, according to Leber, branches of the ciliary arteries directly enter the retina. The rapidity with which the occlusion takes places exercises an influence on the symptoms. Of the fact that a process of embolism may occur gradually, leading to an entire closure of the canal of the vessel, we find sufficient proof in the records of cases in which obscurations preceded the attack of absolute blindness. The hæmorrhages met with in many cases come from the veins or capillaries as the result of venous accumulation combined with necrosis of the tissue or vascular walls, and are to be regarded as paving the way to an infarctus. Knapp was the first to describe such a condition. In addition to what he observed, and the explanation he offers, must now be added a retrogressive venous current from a neighbouring vein pointed out by Cohnheim. The red spot at the macula lutea which is almost pathognomonic of embolism of the central artery is due to hyperæmia produced by collateral choroidal circulation showing through the transparent retina. It is both theoretically probable and practically established that the primary impairment (cloudiness, necrosis,) will be in the region of the macula lutea, a spot which, in the normal state, is particularly devoid of vessels.—("Archives of Ophth. and Otol.," vol. iii, No. 2, pp. 44–74.)

TRANSITORY LOSS OF SIGHT IN CONNECTION WITH EMBOLISM OF THE CENTRAL ARTERY.

Mauthner ("Medic. Jahrb. v. Stricker," 1873, liv. 2, p. 195–212) explains the temporary attacks of loss of sight which often precede embolism of the central artery of the retina. He narrates the case of a man sixty years of age who, one morning, found the sight of his left eye become defective and then abolished, and in which an embolism was diagnosed with the ophthalmoscope, good sight returning when the arteries resumed their proper size. He suggests that the extremity having become infarcted in the central artery at its origin at one time impedes the entrance of the blood and thus impairs the sight; at another may be forced on by the current, till it block up the artery and again may be washed away entirely.—("Annales d'Oculistique," Sept.—Oct., 1873, p. 208.)

EMBOLISM OF BRANCHES OF THE CENTRAL ARTERY OF THE RETINA.

Dr. Barkan narrates the case of a female patient who suddenly became blind in both eyes for half-an-hour. The left remained so for an hour, and then she was able to see large objects with it. At the end of a fortnight, the field of vision of the left eye was limited downwards, and the upper half of the disc appeared pale, and the upper branches of the artery reduced to mere threads. Some months later the state of affairs had not altered. The region of the yellow spot appeared normal. There was no cardiac mischief. (A figure is given.)

Dr. H. Knapp records three cases, and gives an illustration. One patient was a lady, aged 36, who suddenly felt a dimness of the right eye, which cleared up in the lower half of the field. The lower main branch of the retinal artery was reduced to a thread. There was no affection of the heart. The other two cases were very similar. Dr. Knapp sums up the characteristic features in all these cases of embolism of branches of the central retinal artery, as: (1.) The sudden appearance of the impairment of sight, which at first manifests itself as an obscuration of the whole visual field of the affected eye, but more or less rapidly disappears in one part leaving a defect in the upper or lower half (2.) When a primary branch of the central retinal artery is obstructed, it results in superior or inferior hemiopia; but when a secondary branch only is obstructed a sector-like defect in the upper or lower half of the visual field is observed. At least one border line of both the hemiopic and sector-like defects coincides with the horizontal meridian. (3.) The portion of the optic nerve lying in the opposite direction to the defect in the visual field becomes white and punctate; there is partial atrophy of the optic nerve, which is well set off by the remainder of the nerve retaining its usual appearance unchanged. (4.) The obstructed arteries become thin, seamed with white streaks, and disappear a short distance from the disc. He thinks embolism is the only diagnosis possible in these cases. In cases in which the arteries remain moderately well filled collateral circulation has become established.—("Arch. of Ophth. and Otol.," vol. iii, No. 1, p. 33–9.)

COMMOTIO RETINÆ.

Dr. Berlin writes on the effects produced on the eye by blows from blunt objects, not causing any apparent injury. The first symptom is considerable diminution in the acuity of vision in the centre of the field, and marked resistance of the sphincter pupillæ to the influence of atropine. Within a short time a distinct haziness of the fundus over a considerable area becomes developed; sometimes small hæmorrhages result. The changes are

most marked around the disc and yellow spot. In one case there were two separate patches. The ophthalmoscopic appearances reach their highest development in 24 or 36 hours, and disappear in two or three days, in proportion to the violence of the injury inflicted. The sight improves greatly at first, and then remains stationary; some defect remaining after the retinal haze has vanished. The deficient reaction of the pupil to atropine lasts about as long as the defect of sight. Dr. Berlin gives an account of experiments he has tried on the lower animals. A direct blow on the eye produces changes in the portion of retina directly opposite. An indirect blow produces changes in the portion of retina which would be cut by a line continued in the direction taken by the foreign body. On examining the eyes experimented on, he found that extravasation of blood had occurred between the choroid and sclerotic. The chief injury consisted in a rupture of choroidal vessels. He thinks the transitory character of the symptoms accounts for their not having hitherto attracted attention. He has come to the conclusion that the defect of sight, in many cases, has no connection with the retinal haze. In his opinion it is due to "transitory, irregular astigmatism." He discusses the whole question at great length. The blow may easily influence the lens, and may lead to hæmorrhage in its neighbourhood, which may also influence its form. He disbelieves in "commotio retinæ" altogether. The blow directly influences the part struck in front (lens, iris, &c.), and drives the eyeball against the wall of the orbit. The back of the eye is therefore affected as if by a direct blow from the wall of the orbit; that is a blunt object. The blow in front would not produce any changes in the fundus, unless the back of the eye struck some object.—("Klin. Monatsbl.," Feb., Marz, 1873, pp. 42—78.)

HÆMORRHAGIC RETINITIS WITH DIABETES.

Dr. Haltenhoff records the following case:—An unmarried woman, aged 29, came under his care March 10, 1873. She had had good sight till fourteen days previously, when, on waking in the morning, she noticed a dense fog before the left eye, with black specks floating in front of fixed objects. No cause could be assigned. She had had some pain in the head. She had had no œdema and no loss of blood. She had been quite regular. The left pupil was dilated, oval in shape, and quite inactive. The eyelids and eyeball were movable. There was no diplopia. She could see $\frac{12}{C}$. The right eye was normal. The ophthalmoscope showed opacities in the left vitreous, and a haze for some distance around the optic disc, especially marked along the vessels. There were numerous ecchymoses, some rounded in

shape, others irregular. There were no spots suggestive of Bright's disease. The optic disc was not prominent, and there was no infiltration on it. A week later there was some improvement, the haze being less. At one part a large, radiating extravasation following the course of a vessel was detected. A week later the patient could read IV Sn. at ten inches, and the pupil acted well, but was still oval. Bichloride of mercury had been administered. On examining the right eye a number of very small ecchymoses were discovered along an arterial branch upwards and outwards. The urine was now examined for albumen, but none was detected. A few days later the patient mentioned that she had for long (four or five years) been exceedingly thirsty, and was getting thinner. She had noticed that a drop of her urine left a white spot on any coloured fabric. The urine was now examined again. Its sp. gr. was 1039; it was very pale, strongly acid, contained no albumen, but gave evidence of much sugar. It was frequently tested, and never contained albumen. The quantity of sugar did not diminish in spite of treatment, but the thirst was less troublesome. The hæmorrhages became slowly absorbed. There was no affection of the macula. Some fresh small hæmorrhages made their appearance along the retinal arteries. The sight improved. At the end of two months, a few slight vitreous opacities remained in the left eye; the pupil acted, but was still oval; she could read No. 2 J. at 8″, V. $= \frac{1}{2}$. In the right there were a few ecchymoses, and the upper border of the disc was hyperæmic and slightly hazy. She could read 1 J. at $5\frac{1}{2}$″, V. $\frac{16}{20}$. The choroid and lens showed no alteration in either eye. The precise amount of sugar present is given. The author alludes to previous cases published. He thinks, in his case, the retinitis clearly followed the hæmorrhages. The disturbance of normal osmosis, owing to presence of sugar in the blood, might explain the tendency to hæmorrhage. He admits that hæmorrhages (other than retinal) are very rare in diabetes. Possibly the peculiarities of the retinal structure may account for its being specially affected. He was at a loss how to explain the irido-plegia which was present.—(" Annales d'Oculistique," Juillet, Aôut, 1873, p. 20. " Klin. Monatsbl. f. Augenhlk.," Oct. 1873, p. 291.

AMBLYOPIA WITH DIABETES.

Piéchaud (" Journal d'Ophthalmalogie," Aôut, 1872) records the case of a woman, aged 28, who suffered from diabetes and considerable defect of sight. The ophthalmoscope showed pallor of discs, haze of retina around the discs, normal arteries, and

dilated veins. No hæmorrhages; no effusion. — ("Annales d'Oculistique," Jan., Feb., 1873, p. 54.)

OPTIC ATROPHY IN A FATHER IN ONE EYE FROM CHILDHOOD—CONVERGENT STRABISMUS AND NYSTAGMUS, WITH GOOD VISION IN THE ELDEST DAUGHTER, WITH A PECULIAR CONDITION OF THE OPTIC NERVES—TYPICAL RETINITIS PIGMENTOSA IN TWO OTHER CHILDREN; A GIRL OF 21, AND A LAD OF 17, AND IN THE GIRL NYSTAGMUS, CONVERGENT STRABISMUS AND HIGH HYPERMETROPIA.

(Dr. Herm. Schmidt "Klin. Monatsbl.," Jan., 1874, p. 29.)

AEFECTIONS OF THE OPTIC NERVES IN THREE BROTHERS.

Dr. Alexander, of Aix-la-Chapelle. The disease was of a similar character in each, and made its appearance in February, March, and July, respectively, in the same year. The ages of the patients were 29, 23, and 20. There was haziness of the margins of the disc, and of the surrounding portion of the retina. The vision was greatly impaired. No atrophy resulted while under observation. A brother of their mother had some defect of sight. Dr. Alexander regarded the malady as a retro-ocular neuritis.—("Klin. Monatsbl.," Feb., Marz, 1874, p. 62.)

HYPERÆMIA, AND INFLAMMATION OF THE ORBITAL PORTIONS OF THE OPTIC NERVES.

Dr. Schweigger. Six cases. There were no ophthalmoscopic signs. The subjective symptoms varied. There was considerable amblyopia limited to one eye in each case.—("Klin. Monatsbl.," Jan. 1874, p. 18.)

INJURY OF THE OPTIC NERVE.

Dr. Schweigger narrates two cases in which blindness followed injury to an optic nerve.—("Klin. Monatsbl.," Jan. 1874, p. 25.)

EXTRAVASATION BETWEEN THE OPTIC NERVE AND ITS SHEATH ON BOTH SIDES WITHIN THE ORBIT AND IN THE LEFT VITREOUS IN CONSEQUENCE OF FRACTURE OF THE SKULL AND RUPTURE OF THE MIDDLE MENINGEAL ARTERY.

A representation of a section of the left eyeball and nerve (hardened) is given. The extravasation commenced in the connective tissue uniting the outer and inner nerve sheaths, and

reached from the optic foramen to the lamina cribrosa. The clot in the vitreous came from a ruptured vein.—(Talko, "Klin. Monatsbl.," Nov. 1873, p. 341.)

AMAUROSIS IN CONSEQUENCE OF POISONING WITH MORPHIA.

Dr. Wagner was called to a gentleman, aged 32, whom he found in a very drowsy condition, unable to be roused except to give a very deliberate account of himself, with frequent interruptions. He complained chiefly and bitterly of loss of sight, but also of severe pain in the head. It appeared that he had suffered, for five years, from periodic vomiting, and had used sub-cutaneous injections of morphia, himself, to check the sickness. Five days previously he had an attack, which probably did not yield to the remedy, for he used, in that time, thirty grains of the acetate of morphia; the apothecary's reckoning showed he had had four doses of eight grains each, which he had obtained without a medical order. His pupils were very small and quite motionless. The discs were slightly hazy, the veins were normal, the arteries much diminished in size. The light of a bright lamp could not be seen at all. His pulse was 64, firm and small. He had had the last injection twenty-four hours previously. His sight was said to have slowly failed from the first. Dr. Wagner saw him for two days, during which he remained in the same state, and, then, in spite of his condition, he was removed by rail, and Dr. Wagner lost sight of him. Cold applications were used to the head, and draughts of strong coffee ordered.—(Zehend. "Klin. Monatsbl.," x, p. 335.)

TEMPORARY BLINDNESS IN CONNEXION WITH DISEASE OF THE KIDNEY AFTER SCARLET FEVER—RECOVERY.

By R. Förster. ("Jahrb. f. Kinderheilk. und phys. Erziehung." Jhrg. v, p. 325. June, 1872.)

A child, two years old, who was recovering from scarlet fever, again became feverish, and had albumen in the urine twenty-five days after the commencement of the illness. Eight days later the child became blind, and continued so for sixteen days, when, in the course of a few days, the sight became completely restored. The author remarks:—1. On the date at which the blindness came on, quite after the expiration of the exanthematic period; 2. It came on eight days after the appearance of albumen in the urine, and when this was already disappearing; 3. It only disappeared after the albumen, &c., had vanished for some days; 4. Œdema and uræmic convulsions did not occur at all.

Three analogous cases have been recorded in typhus, and four in scarlet fever. The former, during the fever; the latter,

15, 20, 25, 26, and 32 days respectively after the appearance of the eruption, co-existing with Bright's disease, and, except the last case, with uræmic convulsions. The duration of the blindness was, in Ebert's case, from 20—60 hours; in Henoch's, 24—48 hours; Tolmantschew's, 7 days; Förster's 16 days. In all, except the last, the kidney disease persisted after the restoration of sight. Ebert recorded one case in typhus and three with scarlet fever ("Klin. Monat. f. Augen.," vi, p. 91); Henoch, one case with typhus and one with scarlet fever.—(Berlin, "Klin. Woch.," Nr. 2, 1868); Tolmantschew, one case in typhus ("Jahrb, f. Kinderheilk," p. 219, 1869); ("Zehend. Klin. Monatsbl.," x, p. 346).

SPONTANEOUS ARTERIAL RETINAL PULSATION IN EXOPHTHALMIC GOITRE.

Prof. Becker has met with spontaneous pulsation of the retinal arteries in several cases of Basedow's disease. It indicates the severity of the disease. The arteries have lost the power of contracting by muscular action (tonicity) but not their elasticity. They therefore dilate and contract more than normally, and the heart's action being also increased, pulsation becomes apparent in arteries of smaller calibre than usual.—("Annales d'Oculistique," Juillet—Août, 1873, p. 42.)

GALVANISM IN THE TREATMENT OF BASEDOW'S DISEASE.

By Moritz Meyer. ("Berlin Klin. Wochen.," Nr. 39, Sept. 23, 1872.)

The author details four cases in which bronchoceles diminished after galvanisation of the sympathetic. The pulse and the palpitation underwent no change. Chrostek (Wien. Med. Presse, Nr. 19, bis 46, 1869) had already published results which attracted his attention. In the first case, 52 applications; in the second, 72; in the third, 60; and in the fourth, 84 were made. In all, the right side was more affected than the left.

GALVANO-CAUTERY IN OPHTHALMIC SURGERY.

Dr. J. Samelsohn has found the galvano-cautery serviceable:—(1) in closing lacrymal fistulæ; (2) in obliterating the lacrymal sac; (3) in the treatment of trichiasis and distichiasis; (4) in blepharitis ciliaris ulcerosa; (5) in destruction of various new formations; and (6) in old and obstinate cases of *trachoma conjunctivæ*. In the latter he has been very successful. The cauterisation excites no irritation, and, if the conjunctiva is not touched, no pain, and leaves very small scars. He uses a fine platina wire, and at first touched only two or three granulations at a time; subsequently he found more might be attacked with impunity.—("Archives of Ophth. and Otol.," vol. iii, No. 2, p. 124.)

ON THE TREATMENT OF SOME EYE DISEASES BY MEANS OF THE CONSTANT CURRENT.

By Dr. Driver, of Chemnitz. ("Archives of Ophth. and Otol.," vol. iii, No. 1, p. 226.)

GLAUCOMA SIMPLEX WITH A PECULIAR OPACITY OF THE CORNEA.

Dr. Schiess-Gemuseus narrates a case of simple glaucoma with diffused opacity of the cornea. The opacity was of a very peculiar character. The surface had not lost its brilliancy. The cornea looked like shagreen, somewhat as if one had sprinkled a smooth, shining surface of ice with small drops of water, and the whole surface had again frozen. The fundus could not be seen, owing to the condition of the cornea. The author distinguishes his case from forms mentioned by Græfe. After iridectomy, the opacity quickly disappeared, and the vision improved from $\frac{3}{1000}$ to $\frac{12}{200}$.—("Zehend. Klin. Monatsbl.," x, p. 332.)

A PARTICULAR FORM OF HÆMORRHAGIC GLAUCOMA—IRIDECTOMY—FAVOURABLE RESULT.

Dr. Shrœder records the case of a patient (female), aged 62, who came under his care on account of sudden blindness and violent ciliary neuralgia, which had set in two days previously; the appearances were those of acute glaucoma, and iridectomy was performed on the following day. The fundus could not be examined, owing to the opacity of vitreous. This disappeared three days later. An intensely red, round hæmorrhagic spot, half the size of the disc, could then be detected between the disc and the yellow spot. The retina in its vicinity was slightly clouded and swollen, and the two arteries which generally run parallel from the disc to the macula were not to be seen. The hæmorrhage slowly disappeared, and left no trace. This case differs from most recorded in the absence of any prodromal stage. Other differences are pointed out in detail. The author names his case one of "acute" or "primary" hæmorrhagic glaucoma. He thinks glaucoma due to a diminished power of absorption, leading to accumulation of fluid and increase of tension.—("Archives of Ophth. and Otol.," vol. iii, No. 2, p. 75.)

RETINAL AFFECTIONS IN TRAUMATIC FEVER.

By M. Roth. ("Deutsche Zeitschr. f. Chirurgie," bd. 1, p. 471, Sept., 1872.)

Embolic Panophthalmitis. A woman, aged 32, was seized with an affection of her eyes three days after the birth of a child. Three days later she died. The result of the examination led to the diagnosis of retinitis embolica dextra, with secondary panophthalmitis of a puerperal origin. The starting-point appeared to have been the retina, in which, below and at the outer side

of the optic disc, were numerous extravasations, and the vessels were extensively plugged with masses partly homogeneous and fragile, partly granular. The granular masses consisted of small, round, and biscuit-shaped corpuscles. The vessels which were plugged had undergone marked fatty degeneration. The posterior part of the retina was opaque, and infiltrated with isolated extravasations; the whole of the choroid was thickened and infiltrated with pus. The ciliary body and the vitreous contained pus-cells. In the anterior chamber were pus-corpuscles and granular clots. The conjunctiva was swollen and ecchymosed. Grayish yellow deposits were found on the mitral valves, which were thickened. No microscopic examination of the deposits was made.

Retinitis septica, in consequence of traumatic fever. This form is distinguished from the preceding by (1) its more frequent occurrence: (2) its comparatively harmless character; and (3) by the fact that it is not generally embolic. In the neighbourhood of the optic disc and of the yellow spot there are a number of small, white, or it may be red spots, which are mostly present in both eyes. The white spots, anatomically, consist of thickened and hypertrophied nerve-fibres; the red spots, of accumulations of extravasated red blood-corpuscles. Similar accumulations are met with in the retina in Bright's disease, and in cerebral affections, as well as in other chronic or acute diseases. Pyæmia seems, however, to be more specially connected with these changes, and more frequently than other affections. The author thinks these collections depend on a chemical change in the blood, and proceed from multiple abscesses containing apparently good pus; particularly, however, from septic conditions and widely spread putrefactive changes. The earliest period at which the retinal changes appeared was, in one case, eleven days after the commencement of the disease; in the other cases, the disease had lasted several months. Nine cases are related. The author alludes to a case communicated by Virchow, in his "Archiv.," as the only notice of the subject he can find, and this has not attracted much attention.—("Zehend. Klin. Monatsbl.," x, p. 346.)

RETRO-OCULAR ANEURISM (IN A MAN AGED 21), WITH EXTREME PROMINENCE OF THE RIGHT EYE, AND LOUD BRUIT AFTER AN INJURY TO THE HEAD.—COMPRESSION WITHOUT AVAIL.—LIGATURE OF RIGHT COMMON CAROTID TEN WEEKS AFTER THE ACCIDENT.—IMMEDIATE CESSATION OF BRUIT AND DIMINUTION OF PROPTOSIS.—RECURRENCE OF BRUIT IN THREE-QUARTERS OF AN HOUR.—PERSISTENCE OF BRUIT AND (ALMOST) TOTAL SUBSIDENCE OF EXOPHTHALMOS.—PRESERVATION OF GOOD VISION.

THE narrator, Dr. A. v. Hippel (Graefe's "Archiv. f. Ophth.," xx, Bd. Abth., i, 1874), says this is the first case of the kind in

Germany in which the carotid has been ligatured. The patient was a man, aged 21, who came under Dr. Hippel's care for exophthalmos, October 28, 1873. On the 14th of September (6 weeks previously) he had fallen from a horse, and his foot catching in the stirrup, he was dragged along for some distance. He struck the left side of his head. When picked up he was insensible, and was bleeding from the nose, mouth, and left ear. Both eyes were bloodshot, and the right pupil was very small in comparison with the left. In a few hours the left eye was said to have become prominent, and both eyes converged considerably. During the next five or six days the prominence of the left eye passed away, and the right was observed to project and to become very much congested. The patient remained feverish and insensible for three weeks, and it was not until the end of that time that he was able to take any notice of his own symptoms. He found that he could open the right eye very little. When the upper lid was lifted he noticed that the eye was very prominent and red, and that the pupil was very small. He could move the eyeball but very little, and sometimes saw double. The exophthalmos increased slowly and without any pain during the next few weeks. He had repeated attacks of epistaxis, and one attack was very troublesome. At the same time that the eye became more prominent he noticed a loud humming noise in the left ear, and this increased. In the beginning of October he suffered from pain in the left side, and, at the end of a week, a quantity of bright red and very fluid blood (subsequently mixed with mucus) escaped. On admission, a fracture of the left clavicle was found to have occurred. He was quite deaf in the right ear, and no cause for this could be detected. He was stated to have been deaf in that ear from the age of four years, when he had an attack of inflammation of the brain. He complained of a buzzing in the left ear, which had a sort of rhythm. There was considerable defect of hearing. The membrana tympani showed a recent scar, was much thickened and uneven. The left eye was normal. The right projected about half-an-inch, the upper lid was motionless. There was extreme congestion of the conjunctiva, chiefly venous. Enlarged veins could be seen radiating from the upper margin of the cornea, and there was still more marked congestion below. There was great chemosis. There was a slight ulceration commencing in the centre of the cornea. The pupil was very small, but acted on exposure to light. It only became moderately dilated after the instillation of atropine. The globe was motionless and diverged considerably. There was no diplopia. Vision was good. The ophthalmoscopic examination showed the retinal veins to be dilated and tortuous. There was no neuritis, &c. Pressure on the globe caused it to recede considerably, and did not give rise to pain. No pulsation could be detected anywhere, nor any tumour, nor any affection of the orbital walls. A loud

bruit could be heard all over the head. Dr. Hippel thought the absence of pain and fever, and the slow course, showed that there was no inflammatory mischief, and there was no evidence of tumour. An extravasation of blood would have caused symptoms at once, and would have slowly subsided. The presence of the bruit pointed definitely, he thought, to aneurism somewhere. It was loud, blowing, and systolic, was continued into the diastole, and then ceased for a moment; loudest over the right temple. Compression of the right carotid stopped it and also the noise in the ear at once and completely. That the aneurism was not in the orbit he concluded from the fact that there was no pulsation or tumour, that great exophthalmos had developed painlessly, and because it was probable from the nature of the injury that the internal carotid itself, or the ophthalmic artery at its origin, had been involved. The marked exophthalmos did not contra-indicate an intra-cranial aneurism, as observation has shown that it is caused by obstruction to the return of venous blood from the orbit. The great venous congestion present in this case would point in this direction. It was most probable from the severe injury sustained, and the sudden onset of the symptoms, that a diffused aneurism had formed.

The patient was watched for a time, and a compressive bandage applied over the right eye. At the end of a fortnight the eye was much less prominent. The venous congestion was unaltered. The corneal affection had increased. The bruit was unaltered. Digital compression of the right carotid was now practised for several hours a day from November 16 to 21, but only for two hours continuously, owing to the pain caused. On the 19th the bruit had diminished considerably, but it increased again, and was never afterwards checked. The buzzing in the ear altered in character. As local treatment of the aneurism was impossible, and there was a danger that it might burst, or that he would lose the sight of the right eye, it was determined to ligature the carotid. This was done on November 21st (about 10 weeks after the accident) by Prof. Schönborn. No difficulty was experienced. A catgut ligature was used and cut short, and the wound dressed antiseptically. The bruit stopped at once, and a marked diminution in the venous congestion was noticed. In three-quarters of an hour the bruit had returned, but was feebler than before. Prof. Schönborn, thinking that possibly the ligature might have given way, opened the wound in the evening, under chloroform (antiseptically), but found the ligature in place. Compression of the left carotid (for an hour) stopped the bruit, but it returned directly the pressure was removed. On the second day compression was tried for a quarter of an hour, but caused giddiness. On the third day the conjunctiva was less congested, the exophthalmos less, and the globe was more movable. The corneal affection was diminishing. Some pus was let out from

the wound, and a drainage tube inserted. On the fourth day compression was practised for an hour in the morning, and two hours in the afternoon. The intensity of the bruit varied. On the sixth day compression was again tried. The congestion and the prominence of the globe diminished. On the seventh day compression for several hours. The bruit was as loud as ever. The right eye was steadily improving. As the compression did not seem to influence the bruit, it was discontinued. On the eleventh day the congestion was less, and the bruit more feeble. On the sixteenth day the congestion had almost disappeared. The globe no longer diverged, and was fairly movable. The bruit was unchanged in loudness, but the pitch varied. The patient only heard it occasionally. In a few days more the wound was almost healed. On the twenty-third day the patient sat up. An attempt at compression caused giddiness. The patient could read the smallest print with the right eye. No abnormal changes were detected on ophthalmoscopic examination. Six days later the patient went home. At the end of another month (January 23, 1874), he returned (as directed) for another trial of compression. There was still very slight projection of the right globe; the congestion of the conjunctiva had slightly increased. The pupil was still smaller than the other, which was larger than natural. Both acted well. The bruit was unaltered. No pulsation was detected beyond the seat of ligature, but the right superior thyroid was much enlarged. Compression of the left carotid did not stop the bruit, but simultaneous compression of the right superior thyroid did almost stop it. An hour's compression of the carotid was borne, but the compression of the right superior thyroid had to be given up. Compression was tried for two or three hours daily till sixth day; then for six days six hours daily. It seemed to cause congestion of the conjunctiva and pain in the eye, and was therefore discontinued, and the patient sent home.

In reviewing the case, the author remarks that the rapid diminution of the exophthalmos and congestion which followed the ligature contra-indicated an intra-orbital aneurism. The latter would have taken time to shrivel up. The exophthalmos was clearly due to obstruction to the outflow of venous blood from the eye and orbit to the cavernous sinus. In all probability the case was one of arterio-venous aneurism; there was a direct communication between the right carotid and the cavernous sinus. In support of this opinion, he adduces (1) *the nature of the injury*. The symptoms, free bleeding from the mouth, nose, and left ear; extravasation beneath the conjunctiva in both eyes; projection of the left globe; sudden convergence of the eyes, and contraction of the right pupil, made it probable that a fracture of the base of the skull had occurred, running from the left petrous bone across the sphenoid, and rupturing the right carotid within the cavernous sinus. (2.) The slow and painless development of the

exophthalmos of the right eye, without any defect of sight. An extravasation would have occurred suddenly, and a circumscribed aneurism would not be likely to result from such an accident. (3.) The absence of any cerebral symptoms. (4.) The almost complete disappearance of the pathological conditions after ligature of the carotid, notwithstanding the persistence of the bruit. If the bruit proceeded from an aneurismal tumour, one cannot understand how it could recur (showing that blood still flowed) with continued diminution of the other symptoms. On the other hand, if arterial blood were flowing into the cavernous sinus, the diminished flow consequent on the ligature would explain the subsidence of the venous congestion, though the bruit might continue. He calls particular attention to the rapid re-establishment of circulation (denoted by the recurrence of the bruit) within three-quarters of an hour. The previous compression of the carotid probably led to establishment of the collateral circulation. The vessel specially concerned seemed to be the superior thyroid. He discusses the cases of treatment by compression recorded (especially Galezowski's case), and does not think that this plan has been attended with notable success; whereas it probably leads to the rapid establishment of the collateral circulation, and therefore interferes with the success to be expected from ligature which may subsequently be required. He does not think, however, that a sufficient number of cases have yet been recorded to enable us to arrive at a definite conclusion on the subject.

Though in his case the bruit persisted, he is well satisfied with the result, for the operation certainly prevented the total loss of the right eye, which was imminent, and reduced the congestion and exophthalmos. The patient's intra-cranial circulation is now in a more favourable, or less dangerous, condition than before the operation, and we must remember that "in the few cases of communication between the internal carotid and the cavernous sinus hitherto recorded, death has followed within a short period; the prognosis, therefore, is of a very unfavourable character." A tabular statement of cases in which the common carotid was ligatured for orbital aneurism up to the year 1868 is given in the "Klin. Monatsbl. f Aughlk," vi, 1868, p. 114. Since then the only published cases known to the author are, (1) Richet, 1868, "Heidelberg Ophth. Gesell., 1868," fatal result; (2) Socin, 1869, "Klin. Monatsbl.," viii, 1870, p. 56; (3) Schmidt, Odessa, "Klin. Monatsbl.," ix, 219, 1871; (4) Schönborn, 1873 (present case).

TRAUMATIC ORBITAL ANEURISM (? FRONTAL ARTERY)—EXOPHTHALMOS—TUMOUR (PULSATING AND THRILLING) FELT ABOVE AND TO INNER SIDE OF EYEBALL—LOUD BRUIT—SUBCUTANEOUS INJECTION OF ERGOT—DIGITAL COMPRESSION—LIGATURE OF THE CAROTID AT THE END OF SIXTEEN MONTHS—PARTIAL IMPROVEMENT AT THE END OF SEVEN MONTHS.

Dr. Schiess-Gemuseus records the following case ("Klin. Monatsbl. für. Augenhlk.," viii, p. 57, 1870). A woman, aged 40, was kicked on the head by a horse in December, 1867. Her symptoms commenced soon afterwards, but the first description dates April, 1869. The left eye was then very prominent, and the conjunctival veins enlarged. Under the upper lid a tumour was evident in the middle line which passed deeply backwards. Inwards it could be traced over the orbital margin in the direction of the frontal artery. It pulsated strongly and a thrill could be felt over it. The eye was lifted by each pulsation. The patient could hear a loud bruit. A loud systolic bruit, chiefly systolic but also diastolic, could be heard with the stethoscope. Compression of the carotid on the left side stopped the pulsation and the bruit. Compression of the continuation of the tumour upwards and inwards checked the subjective bruit, but not the pulsation. The patient's vision was reduced to one-half in the left eye. On ophthalmoscopic examination the left optic disc was found congested, prominent and ill-defined, and the arteries and veins were tortuous, the latter dilated. At the end of three weeks the tumour was larger and the exophthalmos and the venous congestion had increased. Ergotin was injected under the skin of the upper eyelid after the plan advocated by Prof. Langenbeck. Considerable œdema of the lid, &c., followed, and the patient felt sick. The injection was repeated next day, and on the third day the œdema had almost disappeared. Another injection was followed by sickness and by swelling of lids, &c. In the evening an injection of double quantity. On the fourth day no further injection, on account of the great œdema. The tumour subsequently increased. Thirteen days after the first injection digital compression was tried for eight days, for from one to five hours daily, and then at the end of another week renewed for a week. As no improvement resulted, the left common carotid was ligatured by Prof. Socin on June 15th. All the symptoms at once subsided, but half an hour later there was slight pulsation in the sac, and it seemed to be filling again. The pulsation continued. The ligature separated at the end of three weeks. Secondary hæmorrhage a week later. It was stopped by pressure below the seat of ligature. A strong solution of nitrate of silver was injected also. At the end of five weeks from operation the pulsation, bruit, and thrill had returned. Fresh hæmorrhage occurred, but was again checked by pressure as before. It recurred three days later. The wound healed at the end of two months. At the end of five

months the state of affairs was much the same as before the operation. An attempt was made to ligature the frontal artery, but a network of vessels was encountered. Several of them were tied. Later a compressive bandage was applied. January 29, 1870, the tumour pulsated but feebly, and was very compressible. It seemed to contain only fluid. Its continuation forwards was less marked, but there was distinct pulsation in the *right* frontal region. Possibly the posterior part of the tumour may have consolidated.

EXOPHTHALMOS WITH TUMOUR HAVING A "THRILL" AND BRUIT.

In Prof. Richet's case which was brought before the Ophthalmic Congress in 1868 by Dr. Wecker, the patient was a woman aged 63. The first symptom was a loud bruit on the left side, heard by the patient. Various ocular paralytic symptoms developed. Three months later the eyeball was prominent, and there was marked venous congestion both externally and on ophthalmoscopic examination. An elongated tumour (an enlarged vessel) could be felt at the upper and inner part of the orbit which communicated a peculiar thrill to the touch. A loud systolic bruit could be heard. The exophthalmos increased and the eyeball pulsated. The sight of the left eye failed. Compression of the carotid not succeeding, a ligature was applied by Prof. Richet at the end of two months. A soft bruit could still be heard. The patient died, with cerebral symptoms, 52 hours later. No affection of any artery was found, but there was considerable dilatation of the ophthalmic vein.

EXOPHTHALMOS WITH PULSATING TUMOUR.

Dr. Schmidt's patient was a man aged 25.—("Klin. Monatsbl." ix., p. 220, 1871.) While at home one evening he was taken with a fainting fit, and bled from the mouth. He became insensible. At the end of three months, when he came under care, the right eye was very prominent and the conjunctiva conjested. The margins of the optic disc were indistinct, the veins full and tortuous. Pressure on the upper eyelid, especially inwards, detected pulsation and a thrill. The pulsation was also visible. There was a loud bruit audible also to the patient. Compression of the right carotid only partially removed the symptoms, and compression of both did not completely check them. Ligature was resorted to without trial of any other plan, as the only measure of diminishing the blood-current, &c. After the operation the pulsation and thrill ceased, and the bruit became altered in character, but continued. Six weeks afterwards there was still slight exophthalmos and venous congestion. There was no pulsation or thrill to be detected, but the bruit could be heard faintly.

The patient left the hospital. The ligature had separated on the thirteenth day.

EXOPHTHALMOS—PULSATING ORBITAL TUMOUR—LIGATURE OF THE COMMON CAROTID.

Dr. Œttingen, of Dorpat, records the following case:—A lad, aged 14, came under his care for exophthalmos, with the history that when a year old he struck his head on a step, and that subsequently (during thirteen years) the left eye had gradually become very prominent. The upper eyelid was greatly swollen, the eyeball projected considerably, and a tumour could be felt above and to the outer side of the eyeball. It pulsated and could be emptied by pressure, but quickly filled again. Compression of the carotid checked the pulsation. There was no bruit to be heard. The left side of the head was curiously misshapen, and there was an occipital meningocele of small size, and having a very narrow channel of communication with the interior of the skull. The author discusses the question of diagnosis, chiefly as to whether it was a spheno-orbital meningocele (which is very rare), or an erectile tumour of some sort, which communicated with the inside of the skull by wearing away of the orbital wall. Langenbeck's plan of injection of ergotin and compression of the carotid having been tried without avail, the left common carotid was tied. The tumour diminished in size and ceased to pulsate. The pulsation returned in four hours, but not so evidently. In a few hours pain was complained of in the opposite chest, and in a few days it was evident the patient had an attack of pneumonia. The ligature came away in a fortnight, and the wound was healed in a month. The tumour did not become more solid. Pressure on it made the occipital tumour swell out, and tapping the former with the finger produced a corresponding impulse in the latter. Compression of both jugular veins made both tumours very tense. Compression of the right carotid checked pulsation in the tumour, but when continued for a time had no curative effect. The author discusses cases of pulsating orbital tumour hitherto recorded, and mentions the case of an old woman who came under his care, in 1866, for exophthalmos with pulsation and diastolic bruit, and in which he was led to the diagnosis of some inflammatory mischief within the orbit, leading to plugging of the veins. He obtained a post mortem two years later, and found no changes in the arteries, but evidences of past inflammation of the orbital tissues and partial obliteration of the orbital veins. In the present case he suspected there was a meningocele associated with some arterial angiomatous tumour. The ligature of the carotid was followed by considerable improvement.—("Klin. Monatsbl.," Feb.—Marz, 1874, p. 58.)

EXOPHTHALMOS OF THE RIGHT EYE APPEARING DURING INCLINATION OF THE BODY FORWARDS, AND DISAPPEARING IN THE ERECT POSITION.

Dr. Gruening. The patient was a man, aged 45. Five years previously, while stooping, he noticed the right eye slip forwards. It went back when he stood up. He tied a handkerchief over the eye, and went on stooping. Afterwards the eye invariably protruded when he stooped. It could be pushed back. No bruit could be heard. Prof. Knapp suggested the symptom was caused by gravitation of blood into pathologically cavernous retro-ocular tissue.—("Arch. of Ophth. and Otol.," vol. iii, No. 1, p. 23.)

THE ACTION OF CALALAR IN PARALYSIS OF ACCOMMODATION.

Burow, sen., writes on this subject. He has experimented on himself, his accommodation having been completely paralysed for thirty years, and his pupils dilated. His eyes were slightly myopic, without astigmatism; his acuity of vision normal. Calabar would contract his pupils, but not influence his accommodation in the least. In cases of transitory loss of accommodation he has found that Calabar exercised material influence on the refractive condition of the eye. He mentions cases showing what influence small pupils may have in allowing persons to see well whose eyes nevertheless show considerable anomalies of refraction. One man, who had myopia $\frac{1}{12}$, could see as much without a glass (with very small pupils) as he could with 12. Another man, who had quite lost his accommodation, could nevertheless read small print (with or without glasses), owing to his having very small pupils. Seeing the influence which Calabar exercises in transitory paralysis of accommodation, he recommends its use in cases in which the paralysis threatens to become permanent.—("Klin. Monatsbl.," Feb., Marz, 1873, p. 78.)

EFFECTS OF STRYCHNINE ON THE HEALTHY EYE.

Dr. Hippel gives the results of a number of obversations on the effects of strychnine on the healthy eye.—("Berlin, Klin. Woch.," 1873, Nr. 17.) He injected 2 to 3 milligr. (·030—·045 grain) in one or other temple alternately. He concludes:—(1) That strychnine has no influence on the perception of light. (2) It augments the sensibility of peripheral portions of the retina for blue only. (3) It considerably increases the extent of the field of vision, the acuity of sight, and in indirect vision allows the eye to perceive distinctly objects situated peripherally at a greater distance from each other than in the normal condition. (4) It has no appreciable influence on the accommodation; nor (5) on

subjective visual sensations.—("Annales d'Oculistique," Sept., Oct., 1873, p. 209.)

CASES OF SYPHILITIC GUMMOUS TUMOURS OF THE SCLEROTIC, IRIS, CILIARY BODY, AND OF GUMMOUS TUMOUR OF THE BRAIN, WITH SYPHILITIC DISEASE OF THE OPTIC NERVES,

will be found noted in the "Annales D'Oculistique," Sep., Oct., 1873, pp. 209-14, in an account of an inaugural thesis by Dr. Barbar, of Zurich.

CYSTIC DEGENERATION OF THE IRIS.

Dr. Wecker enumerates cases which have come under his notice in which "cystic degeneration" of the iris has resulted after injury to the eye, followed by retraction of the iris. Owing to a folding of the iris, glueing of the parts together, and distension of the folds with aqueous, "cysts" are formed. It remains to be proved whether cysts of the iris ever form independently of folding of the iris.—("Annales d'Oculistique," Juillet, Août, 1873, p. 34.)

CYSTS IN THE IRIS.

Dr. Feuer narrates two cases in which microscopic examination seemed to show that cysts had developed in the tissue of the iris itself.—("Klin. Monatsbl.," Ap., Mai, 1873, p. 110—123.)

MELANOTIC SARCOMA OF THE IRIS.

By Dr. Argyll Robertson (Edinburgh), and Dr. H. Knapp, (New York).

The patient was a woman aged 24. The symptoms had begun as a slight inflammation in the right eye fourteen months previously. Six months later she noticed she could not see with that eye, and it became painful. When seen there was a small light brown tumour about a line in length and half a line in breadth in front of the iris at the upper and outer part. She could only count fingers. There was distinct glaucomatous cupping of the disc, and the tension was increased. Treatment was refused till two months later when several smaller tumours had developed by the side of the first. The eyeball was excised. Two years after the operation there had been no recurrence. Professor Knapp gives a detailed account of the examination of the tumour (with illustrations). There was no doubt that it was a melanotic sarcoma of the iris. "Not mentioning the rarity of such tumours in general, the case shows some features of particular interest, especially the development of the pseudo-plasm

from the anterior layer of the iris and the great number of small tumours." "There is only one case of melano-sarcoma of the iris on record (by Græfe)." The present case differs from that in the number of tumours, and that the eye had become glaucomatous, which shows that the tumours of the iris follow the same clinical course as those of the ciliary body, choroid, and retina, viz., no irritation in the first stage, glaucoma in the second. All the coats of the eye, except the iris, were healthy. The prognosis was considered favourable as the disease, though malignant in its nature, was still limited.—("Archives of Ophth. and Otol.," vol. iii, No. 2, p. 106.)

IRIDOTOMY.

Dr. Wecker writes an article on this subject, and proposes important modifications as regards the method of performing the operation, and the cases adapted for it. He gives a sketch of its history from the time of Cheselden. Mr. Bowman, at the Opthalmological Congress in London, excited fresh interest in the subject by advocating a plan of incising the iris in cases of zonular cataract, &c., instead of performing iridectomy. In iridectomy the widest part of the artificial pupil is at the periphery, where it is not wanted; in iridotomy the broadest part is central. Mr. Bowman makes a small incision in the cornea opposite the intended pupil, and then introduces a small knife, blunt at the point and back, between the pupillary edge of the portion of iris to be cut and the front of the lens, and then cuts forwards against the cornea. The incision in the iris gapes, and forms a new pupil—(Report of the Ophth. Cong. in Lond. in 1872; Soelberg Wells' Treatise, 3rd edit.). Dr. Wecker uses a triangular keratome with a stop and a pair of forceps scissors. The blades are bent at an angle to the shaft, and are introduced closed, occupying very little space, by pressure on the handle. When this is relaxed the blades separate, but without tearing open the corneal wound. These do away with the necessity of cutting from behind forwards and risking the cornea. The instruments are figured and illustrations of cases are given. He either simply incises the iris (simple iridotomy) or cuts a triangular piece out (double iridotomy). Simple incision of the pupillary margin of the iris is adapted for cases in which the central part of the lens or of the cornea is the seat of opacity, or where the cornea is abnormally curved, that is, in cases in which the patient can see best through the peripheral portions of the cornea, &c. An incision is made in the cornea with the stop keratome opposite to where the artificial pupil is intended to be made, and the knife carefully withdrawn. The scissors are then introduced closed till opposite the margin to be cut, when they are slightly opened and one blade is passed in front of the iris

and the other behind; one snip divides the sphincter pupillæ, and the scissors are carefully withdrawn closed. A drop of atropine is applied and the eye covered. When the aqueous becomes re-secreted, the cut edges of the sphincter will be found to have separated, leaving a good artificial pupil. Every care must be taken not to injure the lens. *Double iridotomy* is necessary where the lens is absent owing to operation or accident, and the pupil has become closed owing to inflammation. The corneal incision is made at the point towards which the stretched fibres of the iris converge. The stop keratome is thrust in within the corneal margin through the iris and false membrane, its point then running parallel with the posterior surface of the same, and is then carefully withdrawn. The scissors are introduced so that one blade passes in front and the other behind the iris and membrane, and these are cut with a quick snip. A second cut is now made, so that the two form a triangle with the apex at the wound. The flap thus formed is retracted by the action of the remaining healthy iris, and an opening remains. In some cases where the iris is much stretched and fairly healthy a simple incision is sufficient. There is very little bleeding, Simple iridotomy is contra-indicated where the iris is wholly adherent to a scar, or hidden behind a dense leucoma, which prevents the operator seeing what he is doing, or where the iris is paralysed. Double iridotomy should only be performed in cases where the lens is absent.—("Annales d'Oculistique," Sept., Oct., 1873, p. 123.)

A METHOD OF ADVANCING A MUSCLE BY MEANS OF A DOUBLE THREAD.

Dr. Wecker contributes a paper on the advancement of muscles. He alludes to the rarity of the operation at present, its difficulties and its advisability. He simplifies the proceeding by (1) not cutting the antagonist muscle, and (2) by the way in which he applies the sutures. He simply detaches the tendon of the muscle which is attached too far back and applies two sutures. It is difficult to draw the upper and lower ends (for instance) of the tendon towards the cornea equally. He makes an incision five or six lines in length in the conjunctiva near the cornea over the tendon to be divided, separates the conjunctiva for some distance, introduces the hook under the tendon and divides it thoroughly. He then takes a piece of silk threaded with three needles; one in the centre and one at either end. He picks up the tendon and conjunctiva and passes the middle needle from within outwards, through the centre of the tendon at a little distance from the cut margin and through the conjunctiva. The two other needles are passed (from within outwards) through the conjunctiva at either end of the incision. The thread is cut close to each needle and two sutures remain. In order to seize correctly the ends belonging to the same suture,

they may be of different colours. To prevent the terminal needles falling off, they should have two eyes, one above another. The thread being passed through both eyes the needle cannot slip. He leaves the sutures in generally three or four days. (The figure given makes his plan quite evident.) He thinks this plan of advancement is indicated (1) in cases of (myopic) divergent strabismus resulting from insufficiency of the internal recti. Advancement of the internal rectus is preferable to division of the external, because the latter is irrational and often insufficient. (2.) In cases of paralytic strabismus where a partial return of function has occurred but the cure stops short. (3.) In cases of secondary strabismus, when the action of the antagonistic muscle is not too marked and allows (during complete relaxation of this muscle, that is, when the patient looks as far as possible to the same side to which the muscle first cut belongs) the cornea to be carried as far as the middle line. If this does not occur, the antagonistic muscle must be divided in addition to bringing forward the one at fault.—("Annales d'Oculistique," Nov., Dec., 1873, p. 225.)

ON THE CONNECTION BETWEEN CATARACT AND DISEASE OF THE NERVOUS SYSTEM.

(Letter from Dr. S. Logetschnikow, to "Zehend. Klin. Monatsbl.," x, p. 351.)

Having met with fifteen patients, all of whom were women (from the age of 16 to 37) who suffered from clonic convulsions and also from complete cataract, Dr. Logetschnikow thinks there must be some common brain mischief causing both. The patients asserted that their sight was good before the convulsions came on. In one, only, did the convulsions follow the first appearance of cataract. It is well known that there is a connection between convulsions in childhood and the occurrence of zonular cataract. The cataract which comes on in middle life in connection with disease of the nervous system is not at all like the local, and for the most part stationary, zonular cataract of childhood, but is complete and soft.

ABSORPTION OF A DISLOCATED LENS (TRAUMATIC CATARACT).

Dr. Haltenhoff records the case of a man, aged 58, who received a blow on one eye from a fragment of stone. When seen the lens was cataractous and dislocated backwards and downwards and caused the iris to bulge forwards. It finally (in the course of three months) became quite absorbed and the patient could see with the aid of cataract glasses. "This case shows

that we may sometimes delay operative interference even in old persons."—("Annales d'Occulistique," Jan., Fev., 1873, p. 71.)

COMPLETE ABSORPTION OF A DISLOCATED LENS.

Dr. Lindner records the case of a man, aged 25, who came under his care complaining of a dull pain in the left eyeball, set up by a blow on the left temple, received from a sack of flour he was unloading from a waggon. A bruise was still evident. There was blood in the anterior chamber, considerable episcleral congestion and numerous subconjunctival extravasations. Examination by daylight and by oblique illumination excited no irritation but gave no positive information. Atropine was instilled, rest enjoined, &c. A week later the blood had in great part disappeared from the anterior chamber, the lens was visible in the anterior chamber, covering the pupil and projecting beyond the pupillary border of the iris. Vision was limited to quantitative perception of light. During the next ten days the treatment was continued, the lens remained transparent but became oblique in position, sloping from below, upwards and forwards. Opacities could now be made out in the vitreous. The patient counted fingers at 14″. The vitreous cleared up and the lens diminished in all directions. At the end of three weeks pain was complained of in the left globe, and the right eye became sensitive to light. Both eyes were covered up and the patient kept in the dark. In five days the symptoms vanished. In a month from the time of admission the patient returned home. At the end of six months he was again seen. The lens was wholly absorbed, the vitreous clear, the fundus normal, and the patient read well with convex glass (+ 4).—("Allg. Wien. Med. Zeit.," Ap. 15, 1873.)

EXTRACTION OF CATARACT BY SMALL FLAP, EXTENDING FROM THE CENTRE TO THE JUNCTION OF THE UPPER AND MIDDLE THIRDS OF THE CORNEA, AND WITHOUT IRIDECTOMY.

Dr. Warlomont discusses the various methods which have been proposed for the extraction of cataract, and advocates the following:—He enters a Græfe's knife at the outer margin of the cornea, one millimètre (half a line) below the centre, passes it straight across the anterior chamber, and makes a counter-puncture exactly opposite. The blade is held with the edge slightly inclined forwards (making an angle of 20 to 30 degrees with the iris) so as to avoid cutting the iris if the aqueous should escape rapidly. After the counter-puncture has been made, the section is made upwards by see-saw movements of the knife, in a direction curving forwards, till the level of the junction of the middle and upper thirds of the cornea, when the knife is brought out almost

perpendicular to the cornea. In order to give the flap a regular curve, its whole breadth should not be cut at once, but the heel and point of the knife should be used alternately. The flap is about 3 mm. (a line and a half) in height, and as broad as the cornea, and its apex is about 3 mm. from the upper margin of the cornea, and forms a tangent to the circle formed by the pupil when moderately dilated. No speculum or fixation forceps should be used. Owing to the shape of the flap, prolapse of the iris is not likely to occur. The lens is readily made to present at the wound, and escapes through it easily. The pupil is dilated as widely as possible with atropine before beginning the operation. The scar is very slight, and is situated above the pupil. Loss of vitreous is not likely to occur. The edges of the wound lie in accurate apposition. The section is made at the least sensitive part of the cornea. Suppuration of the flap is a possible accident, but is very rare. Iritis is little to be feared. There is no risk of irido-choroiditis or of sympathetic mischief. Iritic adhesions only occur occasionally, and are not necessarily connected with the operation. The operation differs from that proposed by Liebreich in several points. Figures are given, showing the steps of the operation.—("Annales d'Oculistique," Jan., Feb., 1874.)

EXTRACTION OF CATARACT.

ZEHENDER gives an account of the various operations which have been proposed of late years for the extraction of cataract.—("Klin. Monatsbl.," Nov., 1873, p. 313.)

REPORT ON SIXTY-FOUR CATARACT EXTRACTIONS ACCORDING TO THE METHOD OF VON GRÆFE.

Compiled by Dr. HASKET DERBY. ("Archives of Ophth. and Otol.," vol. iii, No. 1, p. 74.)

INTRA-OCULAR HÆMORRHAGE, WITH FORMATION OF AMYLOID BODIES IN THE EXTRAVASATED BLOOD, AND AMYLOID DEGENERATION OF THE CHOROIDAL ARTERIES.

By Dr. KNAPP.

THE patient was a man, aged 47. A few days previously he had noticed uneasiness and nearly total loss of sight in the left eye. On examination, the signs were those of opaque vitreous, probably from hæmorrhage. It was supposed that a melanotic sarcoma had been the starting point. As the sight was lost and the globe painful, excision was performed. The microscopic conditions found in the eyeball are given in detail with illustrations. The retina and choroid were in their normal positions. Between the choroid and sclerotic, and between the choroid and retina, there were collections of blood containing amyloid corpuscles. The latter remained unchanged on addition of acetic

acid, ether, and alcohol, but were coloured intensely brown-red by iodine. Addition of sulphuric acid rendered the hyaline globules violet. The arteries of the choroid gave the characteristic iodine reaction in their middle and inner coats. This is the first time that amyloid formations have been described as occurring in the eye. Here they were only met with in connection with the choroid. No special cause for the amyloid degeneration could be detected in the patient's condition.—("Archives of Ophth. and Otol.," vol. iii, No. 2, p. 115.)

CONTIBUTIONS TO THE PATHOLOGY OF CHOROIDITIS.

By Dr. KORTUM.

1. CHOROIDITIS congenita (three cases). 2. Choroiditis specifica (four cases).—("Archives of Ophth. and Otol.," vol. iii, No. 2, p. 91.)

INTRA-OCULAR ENCHONDROMA.

DR. CHISHOLM records the case of a man, aged 25, who came under his care for a tumour of the left eyeball. It was first noticed at the age of three years. When he came under care the left eyeball was represented by a rounded mass as large as a fist. The whole moved slightly when he moved the other eyeball. The tumour was elastic, but did not fluctuate. It was removed without special difficulty and without marked hæmorrhage. On the fourth, fifth, and ninth nights, hæmorrhage occurred, and, on the latter occasion, the left common carotid was ligatured. The next day tetanic symptoms appeared, and on the fourth after the ligature, the patient died. A microscopic examination of the growth was made by Prof. H. Knapp, and the result is given in detail, with illustrations. He considers that the tumour originated in the sclerotic and spread towards the vitreous.—("Archives of Ophth. and Otol.," vol. iii, No. 1, p. 1.)

COLOBOMA OF THE FUNDUS OCULI WITHOUT COLOBOMA OF THE IRIS.

IN an inaugural dissertation, Dr. Hofmann describes a case. The patient was a shoemaker, aged 44, who came under Prof. Saemisch's care. In the left eye there was a coloboma of the fundus oculi with a perfectly formed iris; in the right eye there was a coloboma of the iris as well as of the fundus. These were the only defects of development which could be discovered in the patient. The inconvenience which they caused the patient seemed very slight. He could see better with the right eye in the evening than in broad daylight. This would be accounted for by there being less dazzling produced. *The left eye.* He

could read well; the field of vision was limited upwards, a moving object being indistinctly seen in the whole of the left upper quadrant. (A figure is given.) The iris was of a clear blue colour. In one portion at the lower part the tissue appeared somewhat thinned on focal illumination. On ophthalmoscopic examination in the inverted image, a coloboma, glistening like mother-of-pearl, was visible in the lower part of the fundus. Close to the lower margin of the disc was a crescentic zone just like a commencing staphyloma. Beyond this was a portion of healthy choroid, and then at about the distance of two diameters of the disc from the disc there was a round, excavated, glistening white patch rather smaller than the disc. This formed the real beginning of the staphyloma. Lower still was a bridge of choroid, and then the most extensive portion of the coloboma distinguishable into three parts. (A representation is given.) The most anterior part reached nearly to the ciliary processes. *The right eye.* He could only read 15 (J.) with this eye. The field was very defective in the upper half. The lower part of the iris showed an ordinary coloboma. The edge of the lens could be made out. In the fundus the coloboma stretched from about the distance of a diameter and a half from the optic nerve entrance without any interruption into the neighbourhood of the ciliary processes. A case is also mentioned under the care of Prof. Saemisch, the patient being a woman, in which a coloboma existed in each eye in the lower part of the choroid without any affection of the iris. A brother of hers had a complete coloboma in each eye.

In the case just noted it is remarkable that a fissure of the inner tunics of the eye existed without any affection of the iris, and that the coloboma was divided into two portions which were separated by a bridge of choroid.

MYDRIASIS SPASTICA.

By Dr. Hirschler. ("Wien. Med. Woch.," April 26, 1873.)

Du Bois-Reymond, by observations on himself, has established the fact that pathological irritation of the cervical sympathetic is accompanied by dilatation of the pupil on the same side. He arrived at this conclusion as the result of reasoning and not by accident, or from any defect of sight being produced. He describes the symptoms attending an habitual migraine recurring every three or four weeks, and which he regarded, not, as is customary, as a neuralgia, but as a tetanic affection of the muscular walls of the vessels on the affected side of the head or of the cervical portion of the sympathetic on the right side. The cord-like hardness of the temporal arteries, the pallor of the face and the sunken condition of the right eyeball pointed to a con-

tracted condition of the muscular structure of the vessels. After this idea had suggested itself to him he looked for the dilatation of the pupil which ought to go with this state of things; and when his next attack of migraine occurred, he found his pupil was dilated. He obtained confirmation of this by getting a friend to look at his pupils, and his friend at once told him that the right pupil was dilated. The difference in the size of the pupils appeared more evident in proportion as the eyes were shaded. Just as is the case when the cervical portion of the sympathetic is irritated.

Dr. Hirschler has lately had an opportunity of seeing a marked case of hemicrania, in which dilatation of the pupil was present. It caused the patient no particular inconvenience, and was not detected till he consulted Prof. Löbl. In spastic mydriasis there is no loss of accommodation as occurs in paralytic mydriasis; nor do objects appear smaller as is the case in the latter, and the size of the pupil varies. The patient was a man, aged 31, who had, for three years, been liable to intense pain in the forehead. The trunk of the left temporal artery was visible, whilst the right was not, and it pulsated more strongly than the latter. When seen by Dr. Hirschler the left pupil was $3\frac{1}{2}'''$ in width, and almost wholly immovable. The sight was unaffected excepting that print did not appear so clear nor so black as with the other eye, but this difference vanished on making the patient look through a pin-hole aperture. The patient said the pupil was more dilated when he had severe pain, and this was confirmed by subsequent observation. Both Calabar Bean and Atropine were applied, and the results are detailed. The ophthalmoscopic examination was without result as to alteration in size of vessels. The left ear showed a lower temperature than the right when the attacks of pain were severe. The difference amounted to about 2·7° (F) as tested by the thermo-electric multiplier.

SYMPATHETIC OPHTHALMIA.

Prof. Arlt discusses the anatomical changes met with in sympathetic ophthalmia, the causes which give rise to it, and its treatment. He also gives a historical summary of the literature of the subject. He mentions the case of a lad who was stabbed in the left eye. The wound involved the cornea, iris, and lens, and the latter swelled up, and the pupil became closed. Subsequently sympathetic irido-cyclitis attacked the right eye. Iridectomy was performed on the left eye, and then on the right, and subsequently on the left again, with success. The lad was under care for four years. The author remarks that, had he enucleated the left eyeball, he would not only have done what was useless, but even what was unjustifiable. In any case in which the onset of sympathetic ophthalmia is likely to occur,

or in which it has already set in, he insists strongly on abstinence from any employment of the eyes and the avoidance of exposure to strong light.—("Wien. Med. Woch.," Feb. 1, 8, and 15, 1873.)

WOUND OF ONE EYE—SYMPATHETIC IRIDO-CHOROIDITIS OF THE OTHER —ENUCLEATION OF THE INJURED EYE—FATAL MENINGITIS.

Dr. Pagenstecher narrates the case of a man, aged 42, who had wounded the left eye severely six weeks before he came under care. For a fortnight he had had pain in the head and ciliary neuralgia on the injured side, and for five days he had noticed the right eye affected. When seen, the injured eye was atrophic and painful. The other eye showed marked evidences of sympathetic irido-cyclitis. The atrophied globe was removed. The patient experienced great relief the following night; but at the end of twenty-four hours a rigor occurred followed by pain in the head, febrile symptoms, delirium, &c. He died fifty hours after the shivering, seventy-four after the operation. Evidences of suppurative meningitis, chiefly of the base were found. An examination of the orbits did not reveal any special connection between the operation wound and the intracranial mischief. A detailed description of the different conditions is given, and also of the microscopic examination of the eyeballs. The author thinks it is probable that the suppurative choroiditis set up in the injured eye may have excited meningitis, which was aggravated by the operation. The way in which such irritation could have been brought about he is quite unable to point out. Eyes affected with suppurative choroiditis are so often removed without any ill effects following, that he cannot admit any direct connection between the operation and the meningitis. The original wound was inflicted with a knife covered with blood. Can this have had any influence?—("Klin. Monatsbl.," April, Mai, 1873, p. 123.)

EPITHELIOMA OF THE CHEEK AND LOWER EYELID—REMOVAL—BLEPHAROPLASTY.

Dr. Pooley.

Flaps were taken from the nose and from the forehead. The latter sloughed. The result was good.—("Arch. of Ophth. and Otol.," vol. iii, No. 1, p. 40.)

EPICANTHUS AND ITS TREATMENT.

Professor H. Knapp reviews the literature of the subject and notes cases. He prefers excising a portion of skin from the nose. He describes one operation. A rhomboidal piece of skin

on the root of the nose was first circumscribed and excised. It was over an inch in length, and nearly two-thirds of an inch in width at its broadest part. The skin of both sides was carefully undermined, in long strokes with a very sharp knife. When the bleeding had subsided, the wound was united carefully. The region of the wound was strapped to relieve stretching. He sums up that epicanthus of a higher degree, which does not diminish or disappear during the first four or five years of life is not likely to do so later in life, and should be removed by operation. The operative procedures which attack the integumental fold itself are apt to fail, as the subsequent cicatricial contraction frequently produces relapses. Von Ammon's rhinorrhaphy—removal of a rhomboidal piece of skin from the root of the nose, and uniting the edges with sutures, is a reliable method for the removal of epicanthus. We must endeavour to obtain union by first intention, on account of the disfiguring scars which are left on the back of the nose when suppuration ensues. To obtain primary union, the excision of skin should be done carefully, the adjacent skin undermined without any bruising, and the wound well united by delicate and closely-set sutures. Strapping with court-plaster may help to diminish the tension of the skin. During the first days after operation great care is to be recommended, lest by restlessness of the patient, or some accident, a separation of the wound ensue, the consequence of which would be a bad looking scar.—("Archives of Ophth. and Otol.," vol. iii, No. 1, p. 48.)

Dr. Landesberg contributes a case of *perforating scleral wound followed by complete recovery.* A case of *glaucoma fulminans followed by good vision* (after iridectomy) *and no contraction of field. Two cases of ribbon-shaped corneal opacity complicated with intra-ocular changes* (glaucoma).—("Archives of Ophth. and Otol.," vol. iii, No. 1, p. 58.)

Dr. Martin reports from Dr. Wecker's clinique on:—

1. *Trephining the Cornea in partial staphyloma of the Cornea.*—The object of this operation is to allow of the slow formation of a cicatricial tissue which will tend to diminish the curvature of the cornea. Dr. Wecker's trephine is figured.

2. In *complete cicatricial leucoma* of the cornea, trephining is resorted to in order to create a corneal fistula. Two cases are noted in which some benefit resulted.

3. *Neurotomy.*—The cases in which the sheath of the optic nerve had been incised in neuritis were too far advanced to allow of any amelioration. No harm resulted. A neurotome caché for the purpose is figured.

4. *Tattooing the Cornea.*—Lately, Dr. Wecker had adopted a

plan resembling those recommended in England (Bader and Taylor). After having spread a thick layer of Chinese ink over the opacity, a number of punctures are made in it by means of an instrument consisting of four or five needles fastened together. (Figures are given.) The ink is washed off to see the result, and the process repeated till it is satisfactory. The ink is finally left in contact for a quarter of an hour, the speculum being retained. The conjunctiva should not be pricked, or else black spots will result there also. A good black colour ought to result after two tattooings.

5. *On the Treatment of Ectropion by Snellen's Sutures.*

6. *Operation for Entropion of the upper Eyelid by Snellen's method* (with figures).

7. *On Grafting in the treatment of Ectropion.*

8. *Forceps-scissors.*

("Annales d'Oculistique," Mars—Avril, 1873, pp. 101—15.

INSTRUMENT FOR TREPHINING THE CORNEA OR FOR USE AS AN ARTIFICIAL LEECH.

Dr. Warlomont figures and describes a simple and cheap instrument for use, either as a trephine (for the cornea), or for the abstraction of blood by the artificial leech.—("Annales d'Oculistique," Juillet—Août, p. 31, 1873.)

ABSCISSION OF TOTAL STAPHYLOMA OF THE CORNEA.

Dr. Wecker recommends the following plan. He divides the conjunctiva all round the corneal margin, as if for excision of the globe, and then introduces four sutures from below upwards, through the conjunctiva, and passing across the opening made in it. He draws these to either side out of the way, transfixes the base of the staphyloma with a Græfe's knife, and then cuts the staphyloma away with scissors close to the corneal margin. The conjunctival sutures are now tied. The threads may be of different colours. A figure showing the mode of applying the sutures is given.—("Annales d'Oculistique," Janvier—Février, 1873, p. 51.)

ULCUS CORNEÆ SERPENS.

Dr. Nieden contributes a paper on the treatment of ulcus corneæ serpens. He notes fifty cases in a table. They all occurred in the practice of Prof. Saemisch. The ulcers were in the centre. As soon as it was ascertained either immediately or after a day's observation that the ulcerative process was still progressing, the whole base of the ulcer was slit in the following manner, no

chloroform being administered :—The eyeball being steadied by the fixation forceps, Græfe's knife was thrust into the anterior chamber through the healthy tissue of the cornea on one side near to the edge of the ulcer, and carried so far as the opposite edge, the counter-puncture being made in the normal tissue too. The fixation forceps being taken away the base of the ulcer was slit by gentle to-and-fro movements of the knife, the edge being directed straight forward. The cut was always performed in such a manner that it divided the edge of proliferation in its middle, or at least one segment of it. The aqueous humour escaped slowly from the puncture and counter-puncture, the hypopyon mingling with the last drops. The rest of the hypopyon, if any remained, was left except when it consisted of fibrinous coagulations which protruded into the wound, in which case they were removed by a pair of forceps. If the coagulations did not protrude no effort was made to coax them out by gently rubbing the lids, but they were left in the anterior chamber to undergo absorption. Only in cases where the ulcer occupied a considerable part of the cornea, the cut was modified in such a way that only one end lay in normal tissue at some distance from the actual or the supposed place of the edge of infiltration, while the other end was located in the middle, or more toward the margin of the ulcer according to its dimensions. A sudden evacuation of aqueous occurred twice without ill-effect. An hour after atropine was instilled and repeated four or eight times daily, the patients being kept in bed. No compressive bandage was applied. As long as the ulcer showed any tendency to spread the cut was opened daily by Græfe's knife without fixing the eyeball; the patient lying down and the eyelids being kept open by an assistant. The signs indicating that the treatment may be discontinued are: the total disappearance of the zone of infiltration, the base of the ulcer being sharply defined, the raised edge of the proliferating tissue having sunk to the level of the surface of the ulcer, a uniform greyish hue of the wound and of the base of the ulcer, the latter clearing up, and all the symptoms of irritation of the eye having subsided. This occurs ordinarily within three weeks. The average number of slittings performed in the same case was between six and seven. In some, only one slitting was performed, and in one case twenty. The cases in patients between thirty and forty years of age required the longest treatment. More than one slitting was never performed in the same day; it was never necessary to make a crucial incision. In two cases the reappearance of the ulcerative process made it necessary to slit a second time after the reopening of the wound had been discontinued. The first slitting was sufficient to arrest the disease immediately in 84 per cent. In 70 per cent. the pupillary margin was absolutely free when the treatment was discontinued.—("Archives of Ophth. and Otol.," vol. iii, No. 1, p. 238.)

ON SUPPURATIVE KERATITIS AFTER SMALL-POX. ("Inaug. Diss.")

By Dr. HACKENBURG.

AN epidemic in Berlin afforded opportunity for studying the ocular affections in connection with small-pox. He mentions two. The *first* is a primary iritis associated with cloudiness of the vitreous. The prognosis, apart from the vitreous opacities which may remain is good; the treatment does not differ from that of other forms. Occasionally it develops into an irido-choroiditis which is of serious import. Sometimes opacities are noticed in the vitreous without any pre-existing change in the iris or the formation of adhesions. He, unfortunately, does not adduce any cases of this *first* affection. The *second* is a suppurative keratitis, occasionally associated with secondary iritis and irido-choroiditis, the complications making the unfavourable prognosis of the corneal affection still worse. Eleven cases are detailed. Of these eight were recent; in seven only one eye, and in one both eyes were affected with keratitis; in four of them iridectomy was performed. In the other three cases the mischief was old; in one there was a leucoma (adhærens), and in the other two, leucoma and staphyloma. He also mentions two other cases (XII and XIII) in which previously damaged eyes were attacked; in one there was a perforating ulcer coming on about three weeks after the small-pox, in the other, scars on both corneæ.

The author remarks that the severity of the eruption has no connection with the affection of the eye. For the most part the keratitis occurs after variola; in six of seven cases noted it followed variola; in the seventh varioloid. Generally the keratitis occurs from eight to fourteen days after the commencement of the disease, but occasionally during re-convalescence. The symptoms are discussed. The prognosis is very unfavourable, and the disease resists all ordinary treatment. In one case (VI), Saemisch's plan of repeated incision of the ulcer was adopted, but failed. Iridectomy was then performed, and great improvement resulted. The ulcer was healed in nineteen days. In another (V) case of severe ulceration of the upper half of the cornea, hypopyon, &c., supervening, a small iridectomy was performed six weeks after admission. The iris was "rotten" and the operation was a troublesome one, but the corneal ulcer filled up rapidly at first, and the hypopyon diminished. The healing proceeded more slowly afterwards. At the end of five weeks the cornea had cleared so as to be almost transparent and the ulcer was healed, but the sight had not improved from the time of a week after the operation. Before the operation the patient could only detect movements of the hand at 3 in. from the eye, a week later he could detect them at 8″. On admission

he could count fingers at 4—5′. In a third (VII) case the operation was performed for perforating ulcer, prolapse of iris and fistula of the cornea. Other treatment had been employed for six weeks. The fistula healed and the patient left the hospital in fourteen days. In a fourth case (VIII) extensive keratitis was the cause. The whole of the lower half of the cornea was infiltrated with pus, and was ulcerated on the surface, the upper half was diffusedly opaque, and also ulcerated on the surface. Iridectomy was performed upwards. The advance of the disease was at once checked, the infiltration slowly diminished, and the cornea cleared on the nasal side. Twelve weeks after the operation the patient could count fingers at 8′ and spell words of 16·2 with naked eye. "These cases show, manifestly, the good results which follow iridectomy in suppurative keratitis. This procedure is indicated in all cases in which the disease takes an acute course, and is of great extent, as by it alone the process can be checked, and healing established." The operation may also be performed in cases (IX) of opacity for optical purposes. In one case a staphyloma (XI) diminished after the operation. The cases were under the care of Prof. Schweigger :—Case I.—*Keratitis suppurativa dextra.* M. 36. Variola began five weeks previously; the eye affection three weeks later. Conjunctivitis; cornea, except a small portion at the upper and outer part, ulcerated to its deepest layers. Treatment, atropine, and compress for a fortnight, then aqua chlori. Rapid improvement followed. The patient left a month later. Vision not noted. II.—*Keratitis suppurativa sinistra.* F. 31. Variola seven weeks before; eye affected one week later. Conjunctivitis, cornea infiltrated with pus. She could only tell light from darkness. Treatment, atropine, and compress, then aqua chlori, then Tinct. Opii. Simp. (1 to 9). After 6—7 weeks she could count fingers at 4′. III.—*Keratitis suppurativa sinistra.* M. 29. A month before had variola; and, within a fortnight, eye affection. Atrophy of the globe resulted in spite of treatment. When seen patient could only detect glimpse of light. IV.—*Keratitis suppurativa dextra—Panophthalmitis.* Date not known. Eye affection came on only after some time. M. 8. V.—*Keratitis suppurativa dextra.* M. 26. Variola slight, began a month before, left hospital a fortnight. During re-convalescence. VI.—*Keratitis suppurativa dextra. Iritis.* M. 36. Variola two months before. Eye affection nine days later. Patient could only see light. Superficial ulcer, upper and inner third of cornea. In twelve days Saemisch's plan. Eight days later iridectomy. In three weeks the ulcer was healed, and patient counted fingers at 15″. VII.—*Keratitis suppurativa dextra, prolapsus iridis, fistula corneæ.* F. 27. Variola three weeks before. Eye affection fourteen days later. VIII.—*Keratitis suppurativa duplex—Abscessus corneæ dextræ— Destructio corneæ sinistræ.* M. 46. Variola one month,

eye affection in eight days. — 35. IX.—*Leucoma adhærens.* Variola lasted a month, then loss of sight. The leucoma covered the pupil which was adherent. Movements of the hands at 2—3′. Iridectomy upwards and inwards. Five days later patient read 14 J. X.—*Right staphyloma corneæ; left, cicatrices corneæ.* Æt. 19. XI.—*Right, partial staphyloma; left, leucoma.* Æt. 11. Variola three weeks before Christmas. In the middle of July seen. Double iridectomy; left, inwards and outwards; right, upwards and outwards. Fourteen days later, fingers across the room, right at 1″. The staphyloma was checked. XII.—*Ulcus corneæ perforans.* M. 30. Artropine; cure in ten days. The eye had small opacities from childhood. XIII.—*Corneal opacities.* F. 21. Eyes affected from childhood. Both again from small-pox. Ung. Rub. Precip. Cure in two months. On this subject we may refer to Mr. Marson, Reynold's system, vol. i, p. 443; Mackenzie's Treatise; Mr. Hutchinson on "Inflammations of the Eye occurring some little time after small-pox" Roy. Lond. Ophth. Rep. vol. iii, p. 333. (At p. 369 is an abstract of Mr. Marson's remarks). In the "Brit. Med. Journ." Feb. 18, 1871, p. 169, are noted cases of "Post Variolous Corneitis" under the care of Mr. Hulke and of Mr. Hutchinson (with remarks on the whole subject).

BLEPHAROPLASTIC OPERATION—ERYSIPELAS—SLOUGHING OF THE CORNEA—ATROPHIA BULBI.

By Dr. Wagner. ("Zehend. Klin. Monatsbl.," x, p. 337.)

Two days after the disappearance of the erysipelas, an ulcer, the size of a pin's head, appeared on the cornea, and five days later signs of sloughing of the cornea. This was probably due to the irritation of the branch of the fifth produced by cutting a flap from the cheek, and by the subsequent erysipelas and the cornea affected in a reflex manner.

REMOVAL OF A FOREIGN BODY FROM THE ANTERIOR CHAMBER.

By Dr. Wagner.

The foreign body was of small size, and lay in great part on the iris, but projected slightly into the pupil. The scar in the cornea was slight. It was intended to remove the foreign body through a downward, peripheral section of the cornea, but an attempt to fix the eye resulted in the opening of the corneal wound and prolapse of iris. An incision inwards was made with a lance-shaped knife, and after a great deal of difficulty and repeated trials (which are mentioned) the piece of iron was extracted. It was from 2 to $2\frac{1}{2}$ mm. (·08″—·1″) across, and $\frac{1}{2}$ m. (·02) in thickness. After five days the patient was sent home with good vision. The patient said he could see as well as before.—("Zehend. Klin. Monatsbl.," x, p. 339.)

CORECTOPIA.

Dr. Pooley records a case, and notices the literature of the subject.—("Arch. of Ophth. and Otol.," vol. iii, No. 1, p. 26.) Dr. Alexander (of Aix-la-Chapelle) records a case.—("Klin. Monatsbl.," Feb., Marz, 1874, p. 66.)

ON CAUTERISATION OF THE REFLECTED FOLD OF THE CONJUNCTIVA WITH SOLID NITRATE OF SILVER IN AFFECTIONS OF THE CORNEA.

In certain cases of chronic inflammation of the cornea, attended by ulceration of an atonic character, Dr. Hosch (following Græfe) advocates the use of nitrate of silver. The upper eyelid, being well everted, it will often be found that the reflected fold of conjunctiva thus exposed is swollen and injected. It should be touched with a pointed stick of nitrate of silver, and the eye should then be washed with water. It is advisable to dry the surface first of all before applying the caustic. Cases are narrated. The treatment is only advocated in those cases in which the fold of conjunctiva is manifestly swollen.—("Zehend. Klin. Monatsbl.," x, p. 321—31.)

INOCULATION IN CASES OF PANNUS.

A full notice of a paper by Dr. Brière (in the "Bull. de Ther. Med. Chir.," 1873, 15 Sept.) will be found in the "Annales d'Oculistique," Sep., Oct., 1873, p. 215.)

LEPTOTHRIX IN THE UPPER CANALICULUS.

Dr. Gruening records a case.—("Arch. of Ophth. and Otol.," vol. iii, No. 1, p. 17.)

SPONGY EXUDATION IN THE ANTERIOR CHAMBER.

Dr. Gruening. ("Arch. of Ophth. and Otol.," vol. iii, No. 1, p. 20.)

SARCOMATOUS ECTROPION OF THE CONJUNCTIVA OF BOTH EYES IN A CHILD, CURED BY EXCISION OF A PORTION OF CONJUNCTIVA.

A large fleshy tumour projected downwards from each upper eyelid and was found to be swollen mucous membrane. A figure is given.—(Talko, "Klin. Monatsbl.," Nov. 1873, p. 321.)

CYSTICERCUS BENEATH THE CONJUNCTIVA.

Dr. Brière reports a case occurring in the clinique of Dr. Sichel ("Gaz. des Hôp.," 19 et 29 Juillet, 1873). A tumour near the caruncle had been noticed five weeks. It was about the size of a kidney-bean, fluctuating and tense. Dr. Sichel diagnosed a conjunctival cyst, probably containing a cysticercus, but was

doubtful, on account of the absence of pain, which he had always found present. The tumour was removed, and proved to be a cysticercus.—("Annales d'Oculistique," Sept., Oct., 1873, p. 294, with figures.)

PEDUNCULATED SARCOMATOUS TUMOUR OF THE CONJUNCTIVA PALPEBRÆ SUPERIORIS, CURED BY EXCISION.

A figure is given. (Talko, "Klin. Monatsbl.," Nov., 1873, p. 326.)

EPITHELIOMA OF THE OCULAR CONJUNCTIVA—REMOVAL OF THE TUMOUR WITH A PORTION OF CONJUNCTIVA—CURE.

An illustration is given. (Talko, "Klin. Monatsbl.," Nov. 1873, p. 330.)

TELANGIECTASIS OF THE OCULAR CONJUNCTIVA TREATED BY EXCISION AND CAUTERISATION.

The nævus passed deeply. As much was removed as possible. No irritation followed; but, shortly after, the tumour had resumed its original size. In three months it had quite disappeared.—(Talko, "Klin. Monatsbl.," Nov. 1873, p. 335.)

PERSISTENT REMNANT OF THE HYALOID ARTERY.

Dr. Schapringer records and figures a case. The patient was 11 years of age. The right eye only was affected. There was a vascular loop taking its origin near the centre of the optic disc projecting into the vitreous. Its two branches emerged separately from the area of the disc and were twisted round each other. The loop seemed firmly fixed, for movements of the eyeball did not affect it.—("Arch. of Ophth. and Otol," vol. iii, No. 1, p. 251.)

Dr. Kipp contributes (1) a case of *persistent hyaloid artery in both eyes*. There was a thin cord projecting into the vitreous and ending in three short branches, the free extremities of which were bulbous. The other end immediately in front of the centre of the optic disc formed a small loop and then disappeared. Pressure on the globe produced pulsation in the loop as well as in the retinal arteries. The author thinks this the only case on record where the anomaly existed on both sides. (2) A case of *syphilitic iritis with gelatinous exudation*.—("Arch. of Ophth. and Otol.," vol. iii, No. 1, p. 70.)

FOREIGN BODY ENCAPSULED IN THE VITREOUS WITH PRESERVATION OF GOOD VISION.

A man came under the care of Prof. Arlt six days after his left

eye had been struck by a piece of steel. The eye was somewhat irritable and there was a dark line radiating from the sclero-corneal margin indicating where the foreign body had entered. The iris was slightly discoloured. The lens capsule was not wounded and there was no opacity of the lens. A glistening slightly movable opacity was visible in the vitreous. The foreign body had probably entered at the extreme periphery of the iris and had entered the vitreous without touching the lens. The patient was under observation for nine months, and the eye had undergone no material change. He had resumed work for some time.—("Klin. Monatsbl.," Feb., May, 1874, p. 59.)

SMOKED GLASS PREFERABLE TO BLUE GLASS IN ORDER TO PROTECT THE EYE FROM TOO STRONG SUNLIGHT.

Dr. Dobrowolski advocates the use of smoked glass instead of glass of a blue colour in order to relieve the eye from the glare of strong light, because the smoke glass diminishes the intensity of all the colours; whereas the blue glass leaves the eye exposed to the blue rays without any protection. The blue would relieve an eye sensitive to yellow and green, or exposed to yellow and green rays, but does not affect the red, blue, and violet rays. The smoked glass on the contrary diminishes the intensity of colour of all the rays. Anyone accustomed to wear blue glasses cannot leave them off easily.—("Annales d'Occulistique," Sept., Oct., 1873, p. 156.)

A METHOD OF INCREASING THE MAGNIFYING POWER OF THE UPRIGHT IMAGE, WITH OBSERVATIONS ON THE SIZE OF THE FIELD OBTAINED.

Dr. Stammethaus.

As in a case of myopia the erect image obtained (by correction) is more highly magnified than in emmetropia or hyper-metropia, in the latter cases the patient should be made myopic by a convex glass.—("Klin. Monatsbl.," Jan., 1874, p. 1.)

OPHTHALMOSCOPIC OPTOMETRY AND DESCRIPTION OF A NEW OPHTHALMOSCOPE.

By Prof. H. Knapp.

A concave reflector is screwed on one side an oblong plate with the ends rounded off and two discs on the other. The discs revolve and overlap each other opposite the perforation in the mirror, and are provided with a series of concave and convex lenses which admit of great variety of combination. The focus of the combination used can be read off in each case. It weighs two ounces. Its price is 40 dollars (8*l.*)—("Arch. of Ophth. and Otol.," vol. iii, No. 2, p. 1.)

OPHTHALMOSCOPE FOR ESTIMATING REFRACTION.

Dr. Wecker's ophthalmoscope, manufactured by Crétès, of Paris, is figured in the "Annales d'Oculistique," Sep., Oct., 1873, p. 207, ten + lenses from 60 to 6 inches focus and fourteen — lenses from 60 to 2 inches focus are arranged round a disc which is made to revolve by pushing up or down a vertical rod. By this means an observer can try the whole series of lenses quickly. Its price is forty francs.

NEW INSTRUMENTS.

Dr. Warlomont figures and describes ("Annales d'Oculistique," Nov., Dec., 1873.)

(1) *A cystotome with concealed barb.* After the introduction of the cystotome, the barb is made to project from one side by pressure on a small lever-handle.

(2) *A concealed hook* for use in iridodialysis. The hook is pushed out, when required, by the same mechanism as in the former instrument.

(3) *A needle-hook for tearing false membranes, &c., in the pupil.* This was suggested in connection with the plan advocated by Mr. Streatfeild at the London Ophth. Congress, for tearing through membrane, &c., without exercising traction on other parts. He introduces two needle-hooks from opposite sides of the cornea through the same opening in the membrane and then separates them. Dr. Wecker introduces a stop-needle on one side, and then his needle-hook on the other. The hollow of the hook part of the needle, when introduced, is filled by another sharp point which is pushed down inside it. When about to cut, this latter is drawn back a little by a lever-handle, and the hook is available for use.

An improved lid-forceps, especially for the operation of entropion. Dr. H. Knapp has devised a modification of the clamp forceps in general use. He makes the ring surround the margin of the plate, instead of resting on it. When the ring is screwed down it is larger than the plate, and there is a narrow interval between the ring and the plate, so that the eyelid is bent and compressed between them. The same clamp is made available for both eyes. It gives a larger space in which to operate.—"Arch. of Ophth. and Otol." vol. iii, No. 1, p. 25. At p. 220 of No. 2, vol. iii, Dr. Knapp notes a further improvement, and at p. 221, Dr. Argyll Robertson describes forceps which he has been using for some time, which are essentially similar to those of Dr. Knapp.